VOL. 4, NO. 9. SEPTEMBER, 1906.

THE METAL INDUSTRY

WITH WHICH ARE INCORPORATED
THE ALUMINUM WORLD. THE BRASS FOUNDER AND FINISHER
AND ELECTRO-PLATERS REVIEW.

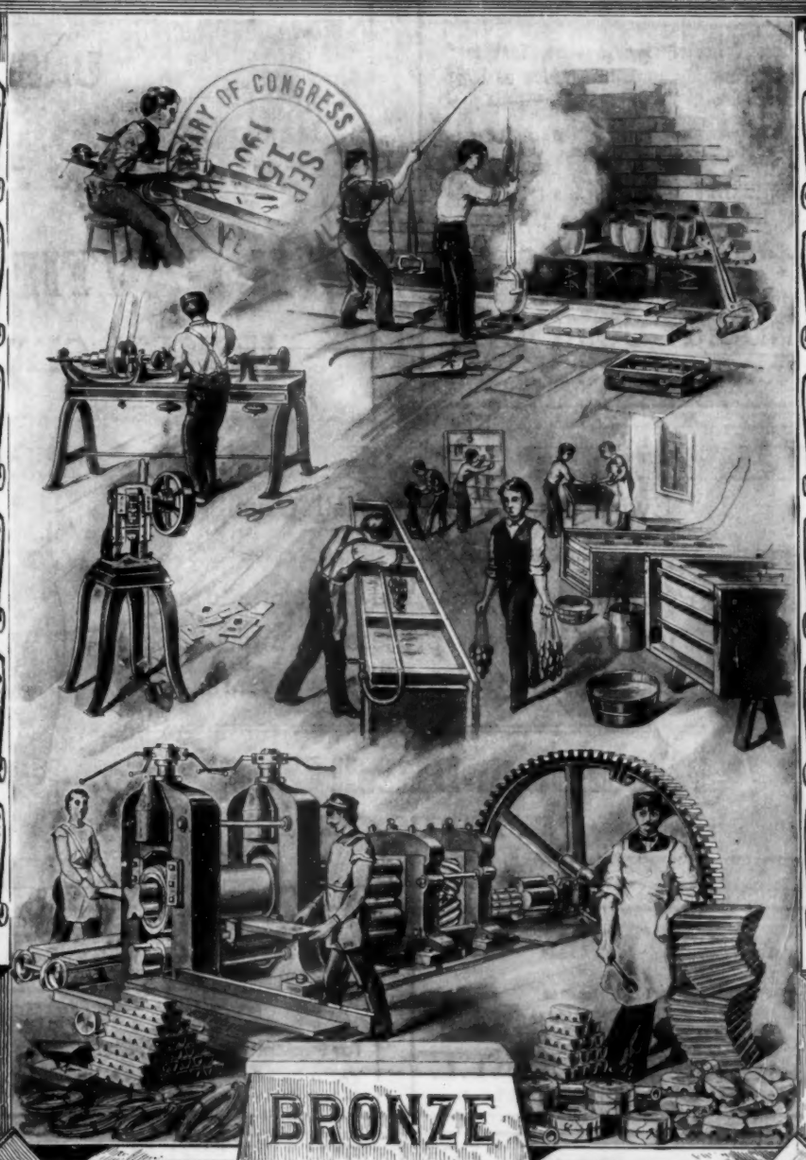
A TRADE JOURNAL RELATING TO THE NON-FERROUS METALS AND ALLOYS.

ALUMINUM · COPPER · NICKEL · TIN · SILVER · LEAD · GOLD · ZINC

METALLOGRAPHY · BRASS · METALLURGY

ROLLING · DRAWING · STAMPING · SPINNING · PLATING · POLISHING

SMELTING · REFINING · ALLOYING · CASTING · FOUNDING · FINISHING



OLD SERIES
FOUNDED OCT., 1894
FOUNDED JAN., 1903
NEW SERIES

LABOR OMNIA VINCIT
"LABOR CONQUERS EVERYTHING"

NEW YORK.

61 BEEKMAN ST.

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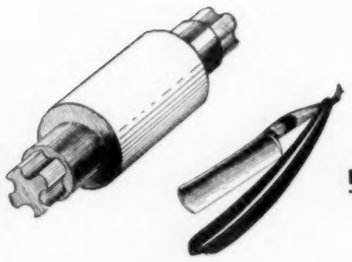

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THE METAL INDUSTRY

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OLD SERIES
VOL. 12, NO. 9.

NEW YORK, SEPTEMBER, 1906.

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VOL. 4, NO. 9.

THE METAL INDUSTRY
EMBRACING
THE ALUMINUM WORLD
THE BRASS FOUNDER AND FINISHER
AND
ELECTRO PLATERS REVIEW

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THE MOLDING MACHINE AND SKILLED MOLDERS.

Much has been said of late concerning the increasing use of the molding machine and the influence it has upon the production of expert molders. It was discussed somewhat at the recent Foundrymen's Convention, but we think the principal factor of the question was not dwelt upon.

The main charge against the machine is that it takes the place of many men and the demand for skilled labor is thereby lessened. Those familiar with foundry history know that from the first appearance of duplicate articles cast in metal there has been an endeavor to produce parts more than one at a time. In early days this meant to have the molder, for the same expenditure of labor and time, turn out more finished molds ready for pouring. The natural and logical step was to make the patterns in multiple. Whenever the article lent itself to the arrangement, the articles were so secured that two or more molds could be made at once. The whole served as a single piece or pattern, and the completed castings were afterward separated. This resulted in multiplying the output of a man many times, and yet this had no effect upon the number of skilled molders.

Then the idea presented itself that a machine could be devised to do the work, with all that type of small articles that would draw readily. It seemed a simple matter to make two half molds and bring them together by mechanical means alone. The molding machine appeared, has been with us ever since, and will continue to extend its field and to grow toward perfection.

We can see no reason to believe that it will have any but a beneficial influence upon the present and future grade of molders. Automatic machinery in other industries has had no hurtful effect upon their mechanics. At the present time, with the wide adoption of labor saving devices in every trade, the skill, experience and brain work of the operator is of a higher grade than ever before, and the results are more brilliant. This is particularly true of the molder of to-day.

The notion that the molding machine has caused a decrease in the demand for men of high skill is a fallacious and dangerous one. It has—and this point is very generally overlooked, although it is of the utmost importance—served to bring about natural selection. The man who is willing to settle down to mere attendance upon a molding machine all his days would never make a molder of decent ability anyway. But the man who handles a molding machine and keeps his mind awake to the possibilities of the apparatus, and who is alert to its application along other lines than those he may be working, is exercising his thinking powers and developing himself into a molder of skill and experience.

The strongest advocates of the molding machine are the first to acknowledge its limitations. They know that the highest work of the foundry will always have to be

done by manual labor, directed by bright and alert brains. In this direction—and it is the best—the demand for molders will always exist. The general all around ability at the present time required of the molder is of a far higher grade than it was a few years ago. The patterns now sent to the foundry with no thought as to their not being reproduced in metal, would have puzzled the entire force only a little while ago. The instructions now are to cast it, and it is cast, and there is no consultation of the foreman with the drafting room, pattern shop and rest of the establishment. The molder has developed into a higher grade of mechanic, and the molding machine has helped and not retarded his development.

THE USEFULNESS OF THE SMALL MOTOR.

The ever-increasing use of the electric motor in various fields of industry is an unquestionable sign of the superiority of electric power over other forms of energy and particularly steam. With tireless determination the companies engaged in the manufacture of electric machinery have contributed towards this increased favor by bending every effort to improve the efficiency and construction of their motors and to bring down the cost of power to very low figures. The power companies who have supplied electric current have also done their share towards facilitating the more extended installation of motors by allowing comparatively cheap rates. In a great many cases they were glad to do so in order to increase the load on their machines at such periods when the consumption for purposes other than power was lightest, so as to enable them to run their machinery more economically.

One of the most potent factors in the introduction of electrical machinery for power purposes has undoubtedly been the great flexibility of the electric current and the ease with which it could be transported almost anywhere within reasonable distance to where it was wanted. The ease and convenience with which an electric motor can be started and stopped is also a great point in favor of its use, as is the saving in cost which results from the possibility of shutting it down entirely when it is not required to operate the particular tool to which it is attached, and doing away with the necessity of turning uselessly a series of shafts and belts. Within recent years the constructions for obtaining a variation of the speed of electric motors have also been considerably simplified.

In common with other branches of the manufacturing industry, the application of the electric motor for purposes of operating machinery in the industry of working metals has increased enormously. From the ponderous metal working lathe down to the small polishing wheel, hundreds of sizes and kinds of machines are driven by electricity. In fact, one would almost be tempted to say that it is an ideal form of energy for the small manufacturer who does not care to go to the trouble, or who has not enough power requirements to put in a steam or gas engine plant of his own. The construction of good and reliable machinery has even extended down to the smallest sizes which are used for very light power service such as small polishing wheels, etc. Such motors can be readily attached to any lighting circuit for alternating or direct currents.

There is every indication that the application of electric motors for driving metal working tools will be extended still further than it is at present. The aim of the constructors has been always to adapt the electric motor to the machine as far as it was possible to do this. In speed control and power this has been done in a wonderfully effective manner. The tool builder has met his part of the problem and grasped the facilities and conveniences provided by the motor as an individual prime mover. He has, where necessary, changed his patterns to such an extent as to accommodate the motor, and has placed it in the position best suited to the drive. It is very evident that while much progress has been made in this direction, there is much to be done to take full advantages of all the possibilities of the motor.

OUR ADVERTISERS.

In our August number we published an opinion of one of the leading publishers on "The Good Will Created by Advertising" and now we wish to say a word about our advertisers and to impress upon our readers how much valuable information there is in our advertising pages. Every one reads the text of THE METAL INDUSTRY, but the advertisements should not be overlooked. These advertisements may be classified under three headings—Display, Directory and Want.

We believe it is no exaggeration to say that our display pages containing the leading producers and manufacturers of metals, supplies and machinery, and that these display pages are a constant guide for all buyers of foundry, shop and plating equipment. A glance at the character of the advertisements will prove this assertion and typographically speaking we are convinced that there are no more attractive advertisements any where than THE METAL INDUSTRY half page and page displays. It is certainly a pleasure as well as a profit for our readers to look over them every month.

The Directory feature of METAL INDUSTRY advertising was established to classify a large number of advertisements of such a nature that the advertisers do not require display space to sell their products but do require publicity as every one in business does. These Directories furnish a means of keeping the name of an individual, firm or corporation before the trade every month under a classified heading and at a very small cost. The advertisements appear in the same position in the paper each issue, therefore they are always available for reference.

THE METAL INDUSTRY Want Ads. are designed to bring the immediate wants of the industry on a page of our journal. By this means the seller and the buyer, the employer and the employee and every one who has a want of any sort or wishes to dispose of something are put in touch with each other and can readily sell their product, skill or equipment to the best advantage. The increasing popularity of these Want Ads. and the prompt service which has been rendered our patrons during the past year speaks for itself.

In general, therefore, about everything needed in the operation of a business connected with the metal industry will be found mentioned in the advertising pages of THE METAL INDUSTRY. We certainly believe it is to the interest of our patrons to read our advertising pages as carefully every month as they do our reading columns.

A BOOK ON SILVER.

We frequently receive inquiries for a book on silver and the making of jewelry. One of the best books on the subject is that prepared by H. Wilson under the title "Silver Work and Jewelry," price $1.50, post paid. This is a practical treatise, written in a plain and brief style, and thoroughly illustrated. It will prove of value to both the expert and the student.

SYSTEM IN FIGURING BRASS FOUNDRY COSTS.

By D. C. Eggleston, M. E.

Authorizations for doing work in the brass foundry are issued by the Shop Order Department to the foreman. The orders are issued in multiple, copies being sent to the Shop Tracing, Inspection and Material Order Departments. The copy of the order sent the Tracing Department is used in making a record of the order on the Shop Tracing Sheet. The date, order number, and quantity of parts called for on the order are recorded. Porters move all material when authorized by destination tickets, which are made out by the shop clerks in duplicate. These bear the date, order number, workman's name and destination. The original remains with the material to identify it and the duplicate is sent to the Shop Tracing Department that the deliveries on an order may be recorded. If the amount delivered falls short of the amount ordered the Shop Tracing Department investigates the cause, and if the missing parts cannot be found a notification must be sent to the Shop Order Department so that an order can be issued to replace the parts lost, the cost of which is charged to the indirect expense account of the brass foundry. When the deliveries on an order are complete the shop tracing sheet is sent to the Shop Cost Department as their voucher for the deliveries on an order.

Form 4 B. S.

RAW MATERIAL DELIVERED

FROM STORE NO. 1

KIND 4 lbs #1 Brass

SIZE

QUANTITY 10 lbs

ORDER NO. 3127

BRASS FOUNDRY. DEP'T.

FOREMAN M. LINDNER.

DATE 5/1/6

DELIVERED BY Lee | CHECKED BY

ENTERED BY

MATERIAL ORDER DEP'T.

THIS COUPON MUST BE SENT TO THE MATERIAL ORDER DEPARTMENT WHEN STOCK IS DELIVERED.

FORM 1.

The Inspection Department file their copy of the order for reference when the time comes for inspecting the material.

The Material Order Department use their copy of the order in posting the Schedule Record Card, on which a list is kept of the amount of material required to fill orders sent to the shop. This makes it possible to place an order for material before the supply is exhausted.

When ready to commence work the foreman obtains material from the store room by making out a raw material delivered slip, Form I., and sending it with the order on brass foundry, Form 2. The stock keeper notes the amount of material drawn on the Stock Slip, Form 3, in black ink, and if any is returned notation is made in red ink.

Daily the stock keeper sends the raw material delivered slips to the Shop Cost Department, as their notification of the amount of material delivered and the order number it was delivered on. From these it is an easy matter to summarize the amount of material used by class of work done, machine, die or tub work, if the order number is referred to each month for purposes of figuring costs.

All supplies and small tools are delivered on a Supplies Delivered slip, Form 4, which are daily sent to the Shop Expense Department to facilitate the work of distributing the indirect expense.

Each day the foreman makes a report of labor giving the names of the workmen arranged according to class of work done. This report is forwarded to the Pay Roll Department, after which it is sent to the Shop Cost Department for use in figuring the costs.

In a large plant it is usual to treat the foundry as a special department and make transfers of fixed charges, power, rent, tools, administration and material expense from the general shop to the foundry. An analysis of the items in each division of expense shows that they are incurred either in equipping and maintaining a suitable place for the men to work, or in purchasing, receiving, handling and storing metal or in connection with both. The former division of expense is disposed of as a loading on labor and the latter one as a loading on material. That the rates used may be as accurate as possible it is necessary to make a division between the various classes of work done, since the rate for machine and die work is lower than that for tub and floor work. However, a uniform percentage is used in all classes of work for distributing material expense. The basis for dividing the fixed charges expense, depreciation, insurance and taxes is the value of the plant used, such as machinery, fixtures and tools. It is customary to include all partitions, racks and shelves of a temporary nature under the head of fixtures. All fixed charges on those used in connection with receiving, handling and storing material should be included in the material expense account. Comparatively little power is usually consumed in the brass foundry, but when it is, the power is generally chargeable to the machine class of work. The rent expense charge, which is made up of expense incurred in connection with the cleaning, repairing and general up-keep of the building, is prorated on the basis

Form No. 46 F. S.

ORDER ON BRASS FOUNDRY.

PATTERN NO. _____ DATE _____ 190

MAKE _____ CASTINGS

USED ON _____ FOR S. O. NO. _____

THIS ORDER MUST BE RETURNED TO THE MATERIAL ORDER DEPARTMENT AS SOON AS FINAL DELIVERY HAS BEEN POSTED.

DELIVERIES TO STORE No. 1.

DATE	QUANTITY	WEIGHT	DATE	QUANTITY	WEIGHT	DATE	QUANTITY	WEIGHT

FORM 2.

of the number of square feet of floor space occupied. All space used for storing raw and finished material is chargeable to material expense, and the balance to the various classes of work done. But few tools and supplies are used in connection with material, the majority being assessed against the other division of expense. Administration expense, which is the cost incurred in relieving the productive workers of brain work, is prorated on the basis of the number of productive operators engaged in each class of work. Thus the expense for each month is subdivided by analysis and estimate between each class of work done and material.

The reason for such a careful division of the expense items is for purposes of finding accurate costs. The material expense is prorated on the basis of the value of material used each month, the expense being taken for that period. Labor expense, which is the balance of expense, is prorated on the basis of the number of pounds of castings produced in each class.

Monthly the current cost per pound for producing each mixture is found, which is not so difficult a task as might at first appear. Certain mixtures are usually made by die work, others by tub work and so on. The raw material delivered slips are sorted each month according to orders for the same mixture, thus giving the material drawn for each mixture made. From records of purchases the weights can be extended at the proper prices, thus giving the cost of metal used. The percent which the material expense is for that month of the cost of material used is found and the material in each mixture multiplied by the current percent, which gives the material loading to be added to the cost of material in each mixture. The sum of material and loading gives the exact cost of the material in a mixture.

The foreman's reports on labor are summarized for each month according to the labor spent on each class of work. The first division of indirect expense which is divided between machine, die, tub and floor work is added to the corresponding class of labor, thus giving the total labor charge for the month in each class of work. The entire labor charge is then prorated to the various mixtures made on the basis of the number of pounds of castings produced. All that is necessary in figuring the cost of a job is to know the kind of mixture used and the weight. Though this system may seem complex to some, it is the gradual evolution of the cost system used in the brass foundry on one of the largest electrical works in this country, and the principles explained are applicable to the work of any brass foundry.

Considerable has been published within the last month or two about ornamental metallic surfaces by the use of metallic dust. A complete description of this process, which is known as "dry galvanizing," was published in THE METAL INDUSTRY for January, 1906.

Form 65-SIRN 3

STOCK SLIP

STORE NO.

REQ. NO. FILE NO. SHOP ORDER NO

DATE DELIVER TO

FOR FOR

DESCRIPTION

QUANTITY	PART NO.	DELIVER MATERIAL AS FOLLOWS DESCRIPTION	STORE NO.	PRICE	VALUE RAW MATERIAL		VALUE PIECE PARTS	

FORM 3.

Form 92 E. B.

SUPPLIES DELIVERED

FROM STORE NO 2

DESCRIPTION Shovel

QUANTITY 1

Brass Foundry DEP'T

FOREMAN Bartlett

DATE 5/1/06

DELIVERED BY | CHECKED BY

ENTERED BY | ENTERED BY

MATERIAL ORDER DEP'T. | SHOP EXPENSE DEP'T.

THIS COUPON MUST BE SENT TO THE MATERIAL ORDER DEPARTMENT WHEN SUPPLIES ARE DELIVERED.

FORM 4.

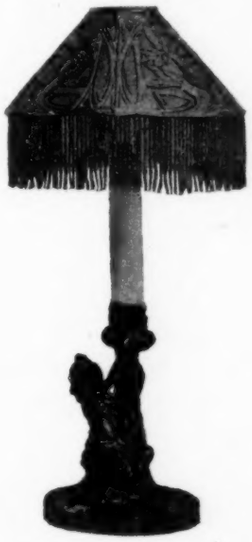
BRONZE BARBEDIENNE FINISH ON ARTICLES OF BRONZE, COPPER AND SPELTER.

By Chas. H. Proctor.

In order to produce a bronze Barbedienne finish on brass the following chemical method may be used. Dissolve in 2 gallons of warm water:

1 oz. sulphuret of potassium,
⅛ oz. red sulphide of antimony,
⅛ oz. yellow sulphide of arsenic,
½ oz. 26% ammonia water.

The articles should either be made of brass or, if they are made of spelter a fairly heavy deposit of brass should be first applied. The article should be scratch-brushed to a dead finish using a little powdered pumice stone on a brush, then washed and immersed in the bronzing solution for ½ minute. It is then washed, dried and scratch-brushed and immersed in the solution for a second time, after which it is washed, dried and brushed with a soft scratch-brush in order to bring up the lustre. It is relieved on the high lights with cloth and pumice stone and lacquered with a heavy body varnish lacquer, and then dried thoroughly with the application of heat. The chemical method is used mostly for solid brass and bronze goods.



GAS PORTABLE FINISHED IN BARBEDIENNE BRONZE.

On plated spelter goods the French bronzing method is mostly used which consists in applying finely divided dry colors and bronze powders mixed with a rapid drying varnish.

For the red brown tones sanguine mixed with pale French gold striping bronze and a little very fine dry burnt umber is used.

For producing the regular bronze Barbedienne finish the bronze powder is mixed with umber only according to the shade which is required. The varnish consists of white French varnish cut in wood alcohol and should be slightly diluted for use with fusel oil. The mixed colors are added sparingly to the varnish, the idea being to apply the color so that it resembles the metal itself. In order to apply the varnish the articles should be brass or copper plated and slightly oxidized and relieved. If the metals are to show above the color a one-half or three-quarter inch rubber set fitch varnish brush should be used and the articles should be gone over rapidly. This procedure may be repeated two or three times without drying in order to produce density of color and luster. When the tone is satisfactory another brush is used which is slightly moistened with fusel oil and a little bronze powder. It is applied lightly to the high relief parts. The article is then dried thoroughly with the aid of heat and when cold it is gone over with clear French varnish and allowed to get thoroughly hard.

In order to produce the dead luster color the articles are first prepared as mentioned above in regard to plating. They are varnished with French varnish, slightly diluted with fusel oil, after which they are dried lightly and the colors are applied as mentioned mixed with turpentine. Hard oil finish varnish should be used and a few drops of oil of lavender. There should not be too much hard oil finish used, however, or the color will show luster. It is applied with a soft brush evenly all over and the articles are dried thoroughly on the heater but not enough to bring up the varnish through the color. This method produces a very dead lustre. When the articles are dry and cold they are rubbed up with canton flannel or a soft plater's hand brush. If a little more lustre is desired the brush is passed over a cake of beeswax and the articles are brushed well.

The clay yellows are produced in the same manner by using sanguine mixed with dry chrome orange. They are applied as mentioned above in the description of the dead luster finish. The high lights which show the metal beneath should be relieved by using wood alcohol, fusel oil or turpentine, and should be toned up with a cloth and a little varnish. Cheaper colors may be used but the results are not as good.

SILVERWARE FOR MEXICO.

Writing from Mazatlan Consul Kaiser says that the hollow ware mostly in that market consists of castors, pitchers, cake baskets, coffee sets, fruit sets, jewel boxes, loving cups, napkin rings, toilet sets, waiters, and novelties. The principal brands on sale are German, and while the Rogers and Meriden ware have a good reputation, but a small quantity of these goods are displayed. The American product is at no special disadvantage, except that there is no stock kept, and that the merchants, who are German, French and Spanish, prefer to buy goods in their own country; most of them are branch houses of European concerns. The Consul states:

"The practical way of introducing goods and opening an account with a local firm, is to send one or more best selling designs, and make a special discount on these samples as an inducement. Only guaranteed plated ware should be sent, as hollow ware of solid silver is mostly used in this part of Mexico. The majority of the Mexican people are not familiar with plated hollow ware, which has never been properly introduced to them. A merchant keeping a well-assorted stock could do a very profitable business, as Mexico is very prosperous and articles of luxury are in good demand."

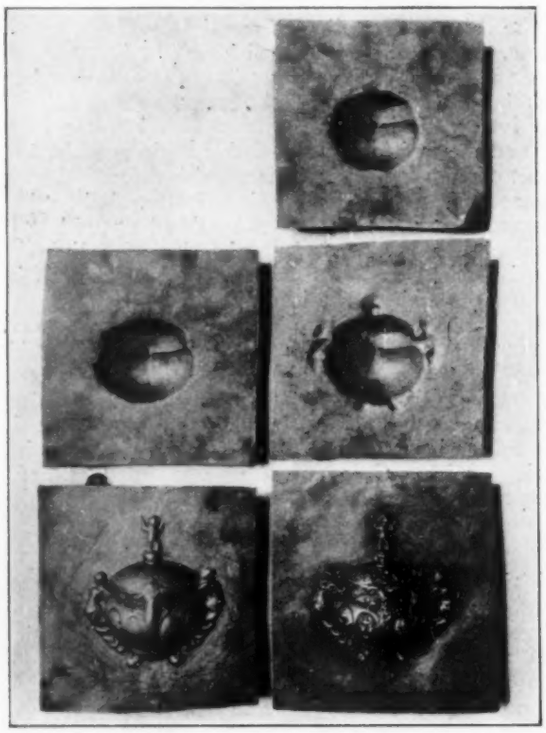
LEAD, TIN, ZINC AND COPPER IN BRAZIL.

Consular reports from Rio de Janeiro, Brazil, state that the imports of lead in pig, ingots, sheet and pipe were about 2,500 metric tons in 1905, valued at $206,-131. Of this amount France furnished about two-thirds while the United States sent practically none. Tin comes almost exclusively from Great Britain and Germany, the amount in 1904 being 1,102,900 pounds. Most of the zinc is from Belgium, over seven-tenths of the total of 1,200,000 pounds imported last year being from that country. Even in copper Europe sends about all that is taken, Great Britain sending about 96 per cent. of all kinds last year.

ART METAL WORK AT THE PRATT INSTITUTE, BROOKLYN, N. Y.

By T. T. Goerck.

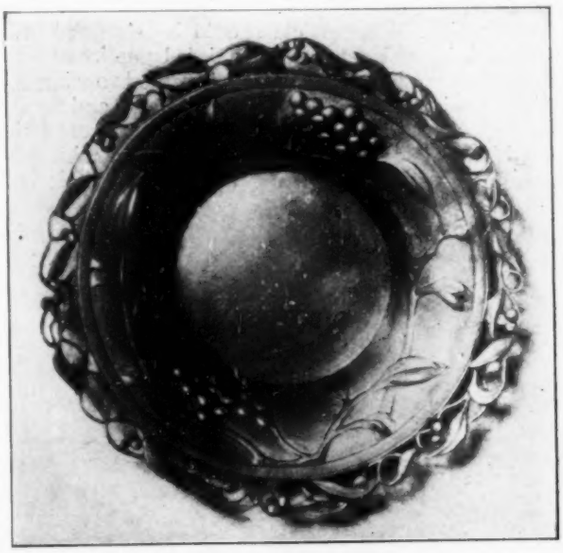
The first thing that confronts a beginner in a metal shop is "What branch of this work shall I take up?" and as he is not familiar with the details it is impossible for him to decide which department he is best suited for, and the advantages to be gained. Modern shop methods



VIEWS SHOWING PROGRESS OF WORK.

are arranged to suit the pocket of the firm and the boy who is ambitious is compelled to study nights in order to make up for the shortcomings of the apprentice system. The boy learns little or nothing regarding the application of ornament or modeling, hence his work becomes mechanical. While he may sometimes become very expert with tools, his brain remains undeveloped, and what artistic ability he may have had at the start has been completely buried; all the thinking and planning has been done for him and he has been turned into a more or less automatic machine.

While we recognize the fact that modern times and competition call for these conditions, the fact still remains that we must have competent men to fill responsible positions, and to obtain these the man must be educated with more than a passing knowledge of his work.



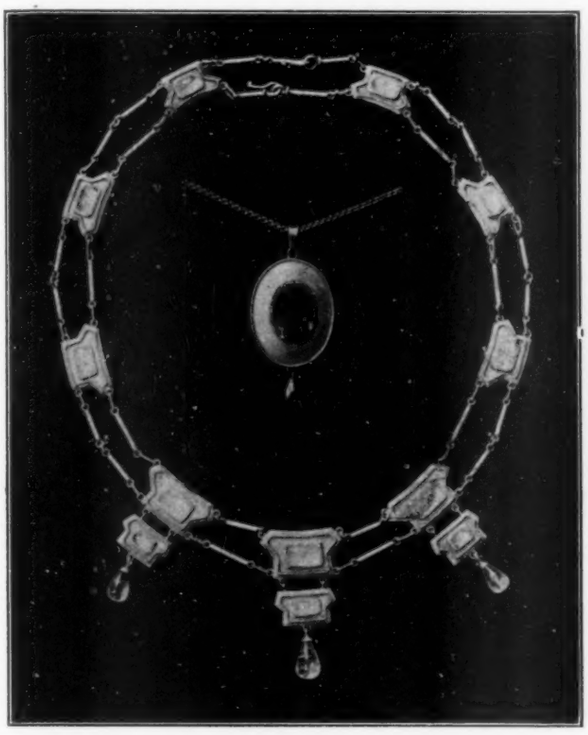
HAMMERED BRASS AND FRET WORK.

To round out his training he must be taught to take the initiative and any originality there may be in his make-up must be carefully developed. In art metal work there is a rapidly growing demand for the man who is truly expert, whether his ability takes the form of jewelry, lighting effects, or household commodities.

It is the purpose of the Pratt Institute, of Brooklyn, New York, to overcome these faults and to equip the worker with an appreciation of form, composition, and modeling, and after due acquaintance with these to take up the practical work. The student is first thoroughly impressed with the necessity of obtaining a perfectly

HAMMERED SILVER. JAR IS ENAMELED.

ing in wax, of his idea. The execution of the idea in metal then follows. This consists of jewelry and its carving, chasing and construction, setting of stones, enameling, etc.; and on alternate days the forming of metal objects, such as bowls, trays, etc., and the design-



GOLD, SILVER AND STONES.

ing of ornament for the same. The ornament is modeled in relief and when satisfactory is applied to the object to be either chased or in repoussé.

The work is carried out in precisely the same way it would be in a first class art metal shop, with all the tools and appliances used in the trade. The metals used throughout are those best adapted to the design; for instance, bowls, placques, trays and the like are made of copper, brass, or silver, and jewelry of gold and silver. All finishing work such as burnishing, lacquering, dipping, coloring, etc., is done by the student with apparatus placed at his service. There is no single operation, from the first inception to the finished article, that is not performed by the student in the class room.

The course covers three years, each school year having three terms of three months each. There is a record kept of each student's work from month to month, and if this shows he is deficient in any particular branch, that is given more attention. Should the student prove unsuited for the line of work he has selected his parents are con-

JEWELRY PENDANTS.

sulted, and in this way his time is not wasted and he has the opportunity to take up something more congenial to him.

The school has a most excellent art reference library as well as countless photographs of the world's best work, both ancient and modern. These afford the student unusual opportunity to become familiar with the work of the masters and their methods.

An exhibition of night work is held every March, and of the day work in June. The general excellence of the work finds many purchasers, and the student who wishes to help himself financially can obtain many commissions. Along this direction the school authorities offer every assistance.

HAMMERED AND CHASED COPPER. SPUN JAR.

Pratt Institute is not a charitable undertaking, but the result of much thought on the part of its founder, who, as a practical man and one who appreciated a good mechanic, desired to help uplift the various callings where

the brain as well as the hands should play a prominent part. The instructors are men actively engaged in this work and familiar with the trade, a point greatly to the advantage of the student. There is a growing demand for these graduates among the manufacturers and many of them have found excellent positions through the kindness of the Institute.

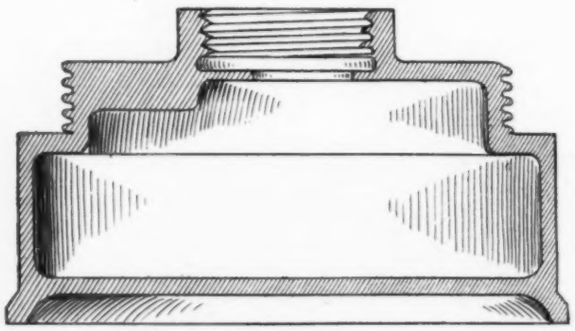
It is not compulsory for the student to take up the entire three years' course. He may take up one winter's work, or one term of three months, though it would hardly be fair to expect much during a single term, unless he had some previous knowledge of the work. There is a growing demand for hand work and the person who excells in unique design and in fine execution is bound to be successful.

CASTING ALUMINUM LAMPS.

A British reader of THE METAL INDUSTRY informs us that he has had a great deal of trouble in casting oil vessels for miners' aluminum lamps, as shown in the sketch. When the vessels were tested under pressure of ten pounds they invariably leaked. Our English friends have tried an addition of 5 per cent of zinc to the aluminum and were not getting satisfactory results. The cups were cast in one piece and vents were provided in the mold for the escape of gas. The firm said that in the course of testing, both what might be called "sweating" and "oozing" took place and that they knew cases where the oil has squirted through the casting.

In advising them about a way out of their difficulty, we would emphasize the following points:

Be very careful to heat the casting alloys as little above the proper pouring point as possible, and this



—CROSS SECTION— FULL SIZE—

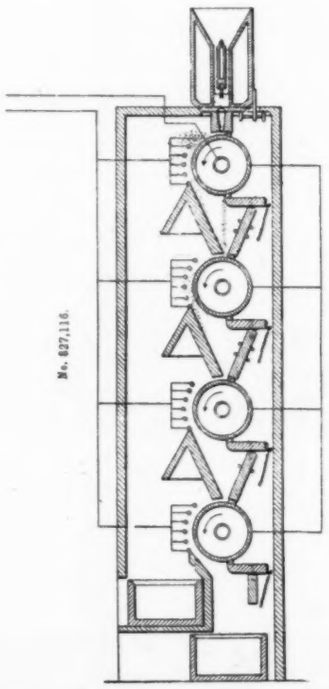
pouring point should be as low as will permit of the metal's flowing thoroughly through the mould. In other words, pour as cold as possible and do not overheat the metal nor allow it to soak on the fire. These are te chief points, the observance of which is necessary in avoiding the presence of pin holes or undue porosity in aluminum castings. The blow holes through which the metal squirts are simply defects and proper manipulation of aluminum will obviate these. It is not, we believe, impossible to secure aluminum castings of the shape specified which will take a pressure of ten pounds without oozing.

Another point is to use a little denser alloy than they have been using. We suggest an alloy containing from 10 to 30 per cent zinc. The more zinc the less liable to objectionable porosity; corrosion, however, is more liable to occur with the high zinc alloy than with the low zinc alloy. By observing the precautions given and following the suggestions mentioned, there should be castings suitable for the purpose.

APPARATUS FOR ELECTROSTATIC SEPARATION.

Patents have been granted, July 31, 1906, to G. W. Pickard, of Amesbury, Mass., and assigned by him to the Huff Electrostatic Separator Company, a corporation of Maine, for an apparatus for electrostatic separation. It has been known from the initiation of the art of electrostatic separation that the processes are assisted materially by presenting the substances to be treated in a perfectly dry state, and consequently it has been the practice to heat the materials before they are fed to the electrodes. This heating facilitates the separation of many materials.

Mr. Pickard has found that if a heated atmosphere be



APPARATUS FOR ELECTROSTATIC SEPARATION.

maintained near and around the electrodes, and, especially, if the electrodes themselves are heated so that the atmosphere is hottest at their surfaces, the resulting separations are far more thorough than under any other condition.

In this device the cylindrical electrodes are vertically arranged and are mounted upon bearings so as to rotate. Opposite these are other electrodes of much smaller superficial extent. The electrodes are connected to an exciting machine. In its passage through the hopper the material is thoroughly heated. The cylindrical electrodes are also heated.

The Metropolitan Museum of Art, New York City, has added to its collection of reproductions a complete set of electrotype copies of the Mycenaean metal work made by the Galvanoplastische Kunstantalt of Geislingen-Steige in Wurtemberg. The collection includes specimens of the wonderful art of the prehistoric Greeks in various metals.

Rumors have it that an aluminum plant costing in the neighborhood of $3,000,000 will be built at Niagara Falls. We have been unable to verify the statement.

NEW ALLOYS.

By Andrew M. Fairlie.*

The formulas of the new alloys enumerated below have appeared in various journals since January, 1902, and are here republished in tabular form for convenience in reference and for purposes of comparison.

Owing to the innumerable combinations possible in the art of mixing metals, it is hard to arrive at a thoroughly satisfactory classification of the alloys. The fact that an alloy usually contains more than 50 per cent of copper or less than 5 per cent. suggests a means of grouping the alloys into two classes. The first class, called "Copper Alloys," consists of the high-copper metals; the second comprises the low-copper and copper-free mixtures, and is designated "White Metal Alloys." This grouping has been adopted in this compilation. The names printed in italics in the two tables show that the figures opposite were obtained by means of chemical analyses. Following each table will be found short paragraphs, giving some descriptive matter, and the principal uses of the alloys.

COPPER ALLOYS.

Name.	Copper. P. c.	Zinc. P. c.	Tin. P. c.	Lead. P. c.	Nickel. P. c.	Aluminum. P. c.	Magnesium. P. c.	Silicon. P. c.	Iron. P. c.	Silver. P. c.	Manganese. P. c.	Tungsten. P. c.	Phosphorus. P. c.
Cupro-Magnesium	90.00	.....	.....	.....	.....	.....	10.00	.....	.....	.....	.....	.....	.....
Hydraulic Bronze	75.00	14.00	11.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hardware Metal	50.00	34.90	.....	.....	15.00	0.10	.....	.....	.....	.....	.....	.....	.....
"Phono Electric" Wire	98.55	.....	1.40	.....	.....	.....	.....	0.05	.....	.....	.....	.....	.....
Sterline	68.52	12.84	.....	Trace	17.88	.....	.....	.....	0.76	None	None	.....	.....
Platinoid	54.04	20.42	.....	0.15	24.77	.....	.....	.....	0.47	.....	0.15	None	.....
Manganese Resistance Metal	85.00	.....	.....	.....	.....	.....	.....	.....	3.00	.....	12.00	.....	.....
Manganin	82.12	.....	.....	.....	2.29	.....	.....	.....	0.57	.....	15.02	.....	.....
Trolley Wheel Bronze	92.00	2.00	6.00	None	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hydraulic Metal	83.05	6.00	10.81	0.10	.....	.....	.....	.....	.....	.....	.....	.....	.....
Acid-Resisting Metal	82.00	2.00	8.00	8.00	.....	.....	.....	.....	.....	.....	.....	.....	Trace
Victor Metal	49.94	34.27	.....	.....	15.40	0.11	.....	.....	0.28	.....	.....	.....	.....
Needle Metal	84.96	5.31	7.96	1.77	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pattern Bronze	90.00	2.50	6.00	1.50	.....	.....	.....	.....	.....	.....	.....	.....	.....
Turbine Wheel Mixture	86.77	3.48	8.68	1.07	.....	.....	.....	.....	.....	.....	.....	.....	.....
Aluminum Silver	57.00	20.00	.....	.....	20.00	3.00	.....	.....	.....	.....	.....	.....	.....

Cupro-Magnesium.—Used in the proportion of one pound to 100 pounds of copper as a deoxidizing agent. Impairs the conductivity of copper less than silicon or any other deoxidizer.

Hydraulic Bronze.—A metal adapted for steam uses.

Hardware Metal.—Used for harness trimmings, ornaments, etc. It does not roll well, but is useful for sand castings.

"Phono-Electric" Wire.—Used for trolley wire, telephone wire, etc. It has a much higher tensile strength than pure copper, but only 40 per cent of its conductivity. In the manufacture of the alloy, the silicon is nearly all slagged off, consequently little or none can be found in the finished wire by chemical analysis.

Sterline.—A white metal, but classed among the copper alloys on account of its high copper tenor. It is used as an imitation silver.

Trolley Wheel Bronze.—The name implies the use. The zinc is added to give solidity to the casting. The introduction of lead into the alloy results in increased wear.

Hydraulic Metal.—Resists the action of acid mine water better than either red brass, muntz metal, copper-tin bronze, or manganese-bronze. It is remelted once before using.

Acid-Resisting Metal.—Said to be the best strong metal for resisting the action of acid, the lead alloys being too soft for many purposes. The phosphorus is added in the form of phosphor-tin—0.125 pound of 5 per cent phosphor-tin to every 100 pounds of the alloy. Any excess of phosphor-tin over the amount specified will result in blow-holes. The phosphor-tin is added last, and the metal is cast at the lowest temperature at which it will run. This mixture is reported to be particularly useful for sulphite pulp-mill fittings. It will not resist the action of nitric acid (aqua fortis).

Victor Metal.—Another white metal high in copper. It is whiter than German silver, but cannot be rolled. It withstands the action of salt air and water, and consequently is used largely for marine work. To make the alloy, melt the nickel and copper together under borax, then add two ounces aluminum for each hundred pounds of alloy, and finally add the zinc.

Needle Metal.—So called on account of its fluidity, which is such that needles could almost be cast from it.

Pattern Bronze.—The name implies its use for making patterns. It files well and casts sharply.

Turbine-Wheel Mixture.—Inferior in strength to manganese-bronze, but less liable to shrinkage spots and porous areas, which are particularly objectionable in turbine-wheels. The metal should be poured cool.

WHITE METAL ALLOYS.

Name.	Copper. P.c.	Zinc. P. c.	Tin. P. c.	Lead. P. c.	Antimony. P. c.	Sodium. F. c.	Manganese. P. c.	Nickel. P. c.	Iron. P. c.
Kayserzinn	1.58	.....	92.98	.....	5.44	.....	.....	.....	.....
Tempered Lead	.....	.....	0.08	98.51	0.11	1.30	.....	.....	.....
Improved Britannia Metal	2.31	.....	90.10	.....	7.44	.....	0.15	.....	.....
Soft Bearing Metal	0.42	.....	11.40	80.65	7.53	.....	.....	.....	.....
Alkali-Resisting Alloy	.....	.....	.....	.....	.....	.....	.....	5.00	95.00
White Brass	2.00	34.00	64.00	.....	.....	.....	.....	.....	.....

Platinoid.—Used largely in the manufacture of electrical instruments.

Manganese Resistance Metal.—Used as resistance material in place of German silver. The electrical conductivity is only 3 to 4.5 per cent that of copper.

Manganin.—Used as resistance material. The nickel increases the melting point, permitting a higher heat without danger of fusing. The nickel also decreases the temperature coefficient of the electrical resistance.

Aluminum Silver.—A strong white metal high in copper. As it does not tarnish in air, it can replace steel in many instances, e. g., parts of typewriters, adding machines, and similar contrivances. The metal is cast and remelted before final use.

Kayserzinn.—This is practically Britannia metal under a new name. It appeared in 1903, and was imported to this country from Berlin.

Tempered Lead.—To make this alloy, melt the lead, and push the sodium in small pieces into the molten

*Chemist Tennessee Copper Company, Copper Hill, Polk County, Tenn.

metal. Ingots of the alloy should be coated with paraffin to prevent oxidation. It is much harder than pure lead. When used as bearing metal, the caustic soda formed by oxidation of the alloy is said to react with the lubricating oil to form a lubricating soap.

Improved Britannia Metal.—The introduction of the manganese is said to give a finer grain and better finish.

Soft Bearing Metal.—Used for lining car-boxes.

Alkali-Resisting Alloy.—Sometimes contains as much as 10 per cent nickel. Used in the manufacture of machinery which comes in contact with soap, washing soda, blueing, or starches. Alloys containing zinc, tin, lead, aluminum, antimony or silicon are easily corroded by caustic alkali.

White Brass.—A good anti-friction metal having double the electrical conductivity of babbitt, and therefore useful in electrical machinery.

THE CHEMISTRY OF ELECTROPLATING.

One subject of which the modern plater is ever seeking information, and which information he very much needs, is the chemistry of electro-plating. A paper by Prof. Wilder P. Bancroft, read before the International Electrical Congress at St. Louis, reviews the subject very thoroughly, and we herewith print abstracts from this paper.

Part I.

By Prof. Wilder D. Bancroft.

When working with moderate current densities a bad deposit is practically always due to the precipitation of a non-metallic solid with the metal. When one of the single salts in the bath is sparingly soluble, as with the cyanides, this salt may precipitate. In most cases, however, the trouble is due to the presence in the deposit of oxygen either as oxide, hydroxide or basic salt. Whatever will dissolve the salt readily under the conditions of the experiment will prevent its deposition and should therefore improve the quality of the deposit.

I have made a list of the more important additions recommended in the refining, analysis or plating of zinc, nickel, lead, tin, copper and silver. These are as follows:

Zinc.	Tin.
Sulphuric acid	Sulphuric acid
Potash	Potash
Ammonium chloride	Sodium pyrophosphate
Ammonium sulphate	Potassium carbonate
Aluminum sulphate	Acid potassium tartrate
Potassium cyanide	Potassium cyanide
Acid potassium oxalate	

Nickel	Copper.
Sulphuric acid	Sulphuric acid
Ammonia	Ammonia
Ammonium salts	Alkaline tartrate
Potassium cyanide	Ammonium oxalate
Sodium bicarbonate	Potassium cyanide
Sodium bisulphate	Sodium bisulphite

Lead.	Silver.
Acetic acid	Nitric acid
Potash	Ammonia
Fluosilicic acid	Potassium cyanide
Sodium nitrate	Potassium iodide

All the substances under zinc dissolve zinc hydroxide. The first four under nickel dissolve nickel hydroxide; the sodium bicarbonate probably serves to keep the acidity constant; while the sodium bisulphite occurs only in solutions containing free ammonia. All the substances under lead dissolve lead hydroxide. Stannous and stannic acids are soluble in sulphuric acid, in potash and in so-called sodium pyrophosphate solution; potassium carbonate is added only to neutralize an excess of free acid in stannous chloride solutions; while the cyanide and tartrate seem to be of very little value, unless perhaps at the anode. Under copper everything dissolves the hydroxide except sodium bisulphite and this is added to cyanide solutions to prevent loss of cyanogen when the copper changes from the cupric to the cuprous form. All four substances under silver dissolve freshly precipitated oxide; in addition ammonia dissolves silver chloride, while silver cyanide and silver iodide are soluble in potassium cyanide and potassium iodide, respectively.

It is thus clear that there is a simple rational basis for many of the solutions in actual use. It must be kept in mind, however, that the rate of solution is more important than the actual solubility. Thus it is not easy to get a good deposit from an alkaline zincate solution at twenty degrees, whereas it is a comparatively simple thing to do this at forty degrees because the caustic soda reacts with zinc oxide or hydroxide much more rapidly at this temperature. It does not follow from this that a higher temperature would necessarily be even better. At ninety degrees the action of caustic soda on metallic zinc becomes an important factor. With copper sulphate solutions rise of temperature means increased formation of cuprous sulphate and this must be taken into account. In each of these cases a study of the chemical reactions shows the cause of the difficulty.

(*To be continued.*)

POMPEIAN BRASS FINISH.

By Charles H. Proctor.

This finish can be produced upon fancy rolled brass, although upon cast brass, being a little softer, the finish takes quicker. The article should be first acid dipped and then passed through a solution consisting of ½ lb. sulphate of copper and ½ lb. sal ammoniac to each gallon of water used. The solution may be used cold. It produces a very dark drab green. Dry without passing through hot water or washing and in half an hour a greenish film will be noticed. Now dissolve as much carbonate of copper in ammonia as it will take up and then add two or three parts of cold water. Then take a stiff painter's sash tool and apply a little of this solution to the brush and stipple over the entire surface. Dry upon a lacquer heater and in a few minutes a bluish green color will cover the whole surface. Scratch-brush lightly upon the high lights, using a very soft brass wire machine brush. This will produce the olive green upon the high lights. If brass relief is desired just relieve lightly with dry pumice stone. Lacquer with a transparent dip lacquer.

DEPOSITING TIN ELECTRICALLY.

The electric deposition of tin on iron has not as a rule proved commercially successful. The following formula is one of the best for this purpose:

Potassium pyrophosphate	12	oz.
Protochloride of tin.....	4½	oz.
Water	1	gal.

The anodes should be of banca tin. This solution may be greatly reduced in density and give good results.

DOES JAPAN MAKE BRASS TUBES.

By S. D. V. Burr.

Some time ago, perhaps about four years, a party of Japanese visited this country ostensibly for the purpose of studying our institutions. Their interest was manifested in a great variety of subjects, and they seemed mildly pleased with things that were strictly industrial. One of their journeys led them to the Naugatuck Valley, where they were shown through several of the brass and copper mills. It seemed that their attention had been at last thoroughly aroused and they examined every step in the various processes with the utmost care. They wanted to know about every stage of the work from the raw material to the shipping department, and they were more particular regarding minute details than visitors usually are. They smiled in appreciation when the mixtures were explained to them; they studied the foundry and spent much time in sheet and tube departments; they were very much pleased and attentive when the shop methods were explained to them; they even had time to become acquainted with the cost-keeping accounts. Managers and superintendents were examined and cross-examined with that ease and courtesy so habitual with gentlemen from the far East. When the spring had been pumped dry and there was no more information to be had they went away.

The second scene of this little industrial play opens a few months after the above visit. A second party of Japanese came to this country. It is probable that the problem had proved too large and intricate to be solved during the first journey and a second one became necessary in order to pick up threads that were needed for a complete solution. This party, like the first, was interested in the brass industry—to a mild extent—and would be grateful for the privilege of looking through some of the plants. By a strange coincidence all the managers regretted exceedingly that it would be impossible to show them over the plants. Anything else the strangers might desire was theirs, but the works were closed. So they went away again.

The third scene opens in Japan, with the establishment of a complete brass plant. The visit of the gentlemen of Japan to the Naugatuck Valley had borne fruit.

During several weeks past the attempt had been made to find out something definite about that plant; some tangible evidence of its existence and of the work produced by it. The New York Japanese Consul had no information on the subject; neither had the large Japanese houses dealing extensively in brass products. American manufacturers of brass, and exporters having intimate and important trade relations with Japan, were well assured of its actuality, but were not acquainted with, and did not know of, any of its productions. That it did not count as a factor in the trade world was shown by the fact that exports of brass goods to Japan had steadily increased during the last five years in all lines; there had not been a single article in the entire brass list that had shown a lessened demand. The conclusion was therefore drawn that the mill really existed as a sort of geographical spot, and that it was, like the hybrid, unproductive.

This inquiry was begun when a statement appeared in press despatches a few weeks ago that Japan was prepared to furnish everything needed for a battleship or cruiser with the single exception of brass tubing. The statement was confirmed by M. Uchida, the Japanese Consul, but he was unable to assign a reason for the failure of his people to make only one article in such a complex structure as a war vessel. The omission could not be ascribed to scarcity of raw material since Japan is one of the largest producers of copper. Her output of this metal in 1900 was 27,840 tons as against 268,229 tons by the United States, 52,872 tons by Spain and Portugal and 25,604 tons by Chile. Next to iron and coal it is the most abundant mineral found in Japan.

Neither could it be laid to inexperience in the preparation of copper alloys. For centuries the Japanese have been expert in that direction, and they have always had a large export trade in articles having copper as the principal element. Our own trade with Japan has been important, as shown by the following table of imports of copper pig, bars, ingots, plate and manufactured articles:

1901	2,591,271 lbs.
1902	392,269 lbs.
1903	3,965,422 lbs.
1904	2,003,083 lbs.
1905	80 lbs.

The last item in the above table was during the trouble with Russia, when mining was at a standstill.

The battleship item about brass tubes probably referred specifically to condenser tubes, which may be said to be the only composition tubes absolutely essential in marine construction. Of their composition there is no secret, and the Japanese experts must be familiar with the several formulas.

Almost all condenser tubes are ⅝-inch in diameter outside and No. 18 gauge. They are tinned both inside and out to prevent corrosion by the salt water flowing through them and by the steam on the outside. The mixture most used in the merchant marine of this country in a Muntz metal made up of 60 parts of copper and 40 of zinc. The United States Government specifies for the condenser tubes of its warships a mixture of 70 parts copper, 29 zinc and 1 tin. Other proportions may be used, but these may be considered as almost standard.

As has just been stated, the Japanese are undoubtedly familiar with these mixtures and are certainly capable of producing them accurately. Their trouble then must be looked for in the mechanical branch of the process. The Japs have probably found out that having a fully equipped tube mill does not mean the production of tubes, particularly those of as refractory a nature as are required in condensers.

It may be broadly stated that all seamless brass tubes are made in the same way, but there is a vast difference in the ease of carrying on the work and in the results obtained. The facility of operation depends directly upon the character of the alloy—some mixtures are exceedingly ductile and readily yield to the drawing; others stubbornly resist each step and in consequence have to be handled with extreme caution. To the latter class belong condenser tubes, especially those made in accordance with the Government formula, the small percentage of tin rendering the alloy hard and refractory and removing its ductility to a great extent.

Seamless tubes are produced from a hollow billet, care being taken in the molding to have the core truly

central in order to produce a casting having a wall of uniform thickness. Generally the billet is from 3 to 4 inches outside diameter, from 4 to 5 feet long and about half an inch thick. After having been thoroughly cleaned it is passed through the first drawing operation. Owing to the comparatively short and thick form of the billet, the first passes are really pushing operations as the blank is pushed through the dies, this method being followed until the tube has been considerably reduced in diameter and lengthened. The final reductions are made by pulling the tube through the die. Between the passes the tube has to be annealed and cleaned of scale in an acid bath, the frequency of the annealings depending upon the composition of the alloy, and the extent of the reduction that has taken place. As the walls become reduced in thickness greater care has to be observed and the amount of each reduction lessened. Some alloys flow freely and lend themselves readily to the drawing, but this is not the case with condenser tube mixtures which have to be watched at every step of the process.

Given all the appliances necessary, success can only be attained by those having the skill and experience, and the Japanese are probably suffering for lack of these qualifications. Long ere this they have learned that a tube mill is not made up of a collection of automatic machinery; on the contrary, they now know that the personal equation looms up in large proportions at every step and that it is not possible to eliminate this troublesome factor. The Japanese character is bright to imitate, but its centuries of plodding along beaten paths have not tended to the development of the inventive faculties. They can undoubtedly handle machinery when it behaves itself as it should, but they are not quick to see the cause and apply the remedy when trouble arises. Therefore, when compelled to depend upon themselves they fall short in things mechanical. This is illustrated in their steel rolling mills for the production of plates and structural shapes; the product is crude and full of imperfections.

That the Japanese will eventually make brass tubing is a reasonable supposition; it is also natural to believe that it will be a long time before they turn out serviceable condenser tubes.

Perhaps the gentlemen from Japan carried home with them an accurate mind picture of all they had actually seen. But they did not and could not take with them the skill essential for the successful performance of the work.

A BRONZE PEACE TABLET.

A commemorative bronze tablet has been affixed to the wall of the now historic "Building No. 86" in the Kittery Navy Yard, where the Russian and Japanese envoys held their sittings and where the treaty of Portsmouth was signed. The tablet was ordered some months ago from Jno. Williams, Inc., the bronze founders of New York City, who cast the bronze doors of the Congressional Library and many other notable works of bronze. The tablet measures 5 feet 6 inches wide by 3 feet 7 inches high. The inscription is as follows:

"In this building, at the invitation of Theodore Roosevelt, President of the United States, was held the peace conference between the envoys of Russia and Japan, and September 5, 1905, at 3.47 P. M., was signed the Treaty of Portsmouth, which ended the war between the two empires."

The tablet was cast in United States standard bronze: 90 copper, 7 tin and 3 zinc. To this alloy was added, just before pouring, a collection of pieces of bronze and copper of Japanese and Russian origin.

SAN FRANCISCO NEWS.

"Things are more than booming," writes our San Francisco correspondent, and he then proceeds to tell the following news:

Arthur R. Haskins Company, formerly at First and Howard streets, San Francisco, is located at 46th street, Oakland, Cal., manufacturing brass bedsteads, gas and electric fixtures and grille work. Also electro-plating and jobbing.

Shermund and Krauss, formerly of Mission and Third streets, have erected a building at 1433 Mission street and are running full blast making gas and electric fixtures, and doing plating and finishing.

The Roberts Manufacturing Company, makers of gas and electric fixtures, are working over time to fill orders and have put up a plant at Mission near Fifth street.

The Boesch Lamp Company have had to enlarge to keep up with orders at their plant at 1135 Mission street.

A new concern is the Western Novelty and Plating Works, who are ready for business at Minna, near Third street.

The West Coast Metal Works are still building in brick and steel, but are busy buying metals for their new furnaces.

The Pacific Copper Works, Wagner & Sons, have erected a large building on the ruins of the old and are busy filling orders on brewery and distillery copper work.

Blow pipe mining is a new industry in San Francisco, and is being carried on extensively at the site of the shot tower, First and Howard streets. There is at that point a well defined ledge of 2,000 tons of lead and it is being actively mined under the supervision of George Barnett. The Selby Smelting and Lead Company had large warehouses and a lead plant at the shot tower. With the coming of the earthquake fire the metal fell into the debris basement of the building and was mixed up with all kinds of foreign substances. Mr. Barnett applied a blow pipe to the mass with good results. The shot tower, which was the most distinguishable landmark of the manufacturing district, will not be erected again in San Francisco, but a more modern structure will be put up at Vallejo Junction adjoining the Selby cartridge factory. The Selby people are rebuilding their solder and lead plant on First and Howard streets, San Francisco.

CARBORUNDUM PLANT FOR GERMANY.

The Carborundum Company of Niagara Falls has started construction work on a large branch plant in Germany. This company is the sole American manufacturer of carborundum in the various forms in which it is used for grinding purposes, and the demands of its European trade have increased so rapidly that the establishment of a branch works on the Continent has become absolutely necessary.

A Germany company has been formed under the title "Deutsche Carborundum Werke, G. m. b. h." The new works are located at Reisholz, a manufacturing suburb of Dusseldorf. This city is situated on the Rhine and is one of the most progressive manufacturing centers of Germany, being laid out on very modern lines.

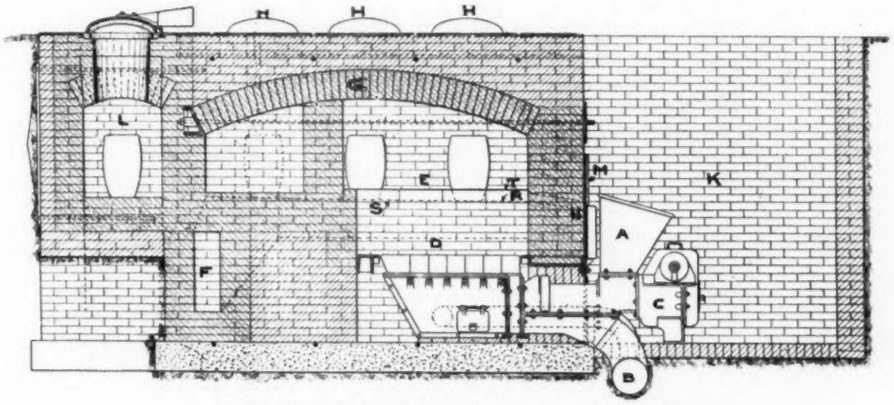
The Carborundum Company has for some time maintained large stores in London and Berlin and has agencies in most of the principal cities of Great Britain, Germany, Denmark, Norway, Sweden and Russia. With the completion of the German works, the European business can be largely increased on account of the better service that can be given.

INDUSTRIAL

NEW AND USEFUL MACHINERY, DEVICES, APPLANCES AND SUPPLIES OF INTEREST TO THE READERS OF THE METAL INDUSTRY.

THE AMERICAN STOKER METAL MELTING FURNACE.

In our issue of November, 1905, we described and illustrated the new metal melting furnace designed and manufactured by the J. D. Smith Foundry Supply Company, of Cleveland, O. Since then the furnace has been somewhat improved, mainly in construction details. The principles underlying the design have been found to be sound, and in extended operation these furnaces have proved very economical in cost of running and attendance, and the output of metal melted has been increased per pound of fuel. In addition, the loss of metal due to oxidation has been decreased and the life of the crucibles lengthened.



CENTRAL VERTICAL SECTION, FRONT TO REAR.

One man devoting his time to the stokers can take care of furnaces melting 40,000 pounds of metal per day. This leaves the melters free to do nothing but charge the drawing pots. The furnaces will melt 100 pounds of yellow brass scrap for 60 pounds or less of a good grade of slack coal. The manufacturers say there is a saving of metal over present practice of from 1 to 5 per cent., depending upon the grade of metal used. The saving in the life of crucibles runs from 10 to 30 per cent.

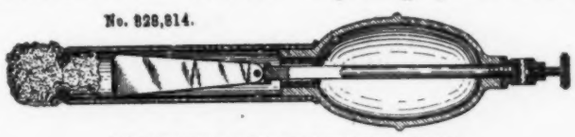
The accompanying drawing is a vertical section along the centre of the furnace from front to rear. The plant consists of the stoker room K, the well-known American underfeed stoker C, the fire box D, the combustion or melting chamber E, the reheating flue L and the flue running to the stack. Slack coal is fed into the stoker hopper A, from which it is passed to the fire box. A forced draft of about 3 ounces is used. The crucibles are charged through the holes H in the crown of the furnace into the combustion chamber E, having a temperature of about 2,800 degrees. The crucibles rest on a wall S having a protecting side T toward the fire box. This side T prevents any metal spilling into the fire box. Any metal spilled runs into the collecting channel R, which has a hole toward the furnace front M, and runs out of the hole N, which is ordinarily plugged with mineral wool or asbestos.

It will be noted that all metal is kept from the fuel and ashes. This does away with one of the greatest annoyances in the foundry business, namely, the expense, loss and nuisance due to the milling of cinders. The products of combustion pass around the crucibles to the side flues and thence through flues F to the reheating chamber L, which has a temperature of about 700 degrees. This reheating chamber receives the empty pots which may be charged with cold metal and then charged into the furnace proper when a melted pot is pulled. The object of installing the reheating chamber is to increase the fuel economy and the speed of melting. After passing the reheating chambers the gases have no further melting value and pass to the stack through the main flue.

When a pot is charged or pulled, the draft is cut off by moving a lever. Two or three times each hour the furnace tender fills the stoker hopper with coal, the time required being not over 10 minutes per hour per stoker. At noon the fire is cleaned; this requires about 15 minutes. If the fire is started at 6 o'clock in the morning the first pot may be pulled before 9:30. These furnaces are built in place complete, ready for operation.

APPARATUS FOR ELECTROPLATING.

Letters patent issued to Frank R. Cunningham, of Medford, Mass., August 14, 1906, cover a device for electroplating without dipping the article to be plated in a solution. This method, which is generally termed "sponge plating," is employed when a portion only of an article is to be plated or when it is not feasible to immerse it in the solution. In plating by this method as heretofore practiced the operator, standing over the tank containing the solution, takes in one hand the anode, composed of the metal to be deposited covered with cloth or other suitable absorbent material moistened by dipping it into the solution and applies it to the article to be plated which is held in the other hand.



APPARATUS FOR ELECTROPLATING.

The anode is brushed over the article or the portion of it to be plated as often as required and is kept moist by frequent dipping in the solution. This method is open to the objection that in holding the anode in the hand the solution comes in contact with the skin, and as the operator must stand over the vat he is obliged to inhale the fumes arising from it. In addition the operation is exceedingly tedious.

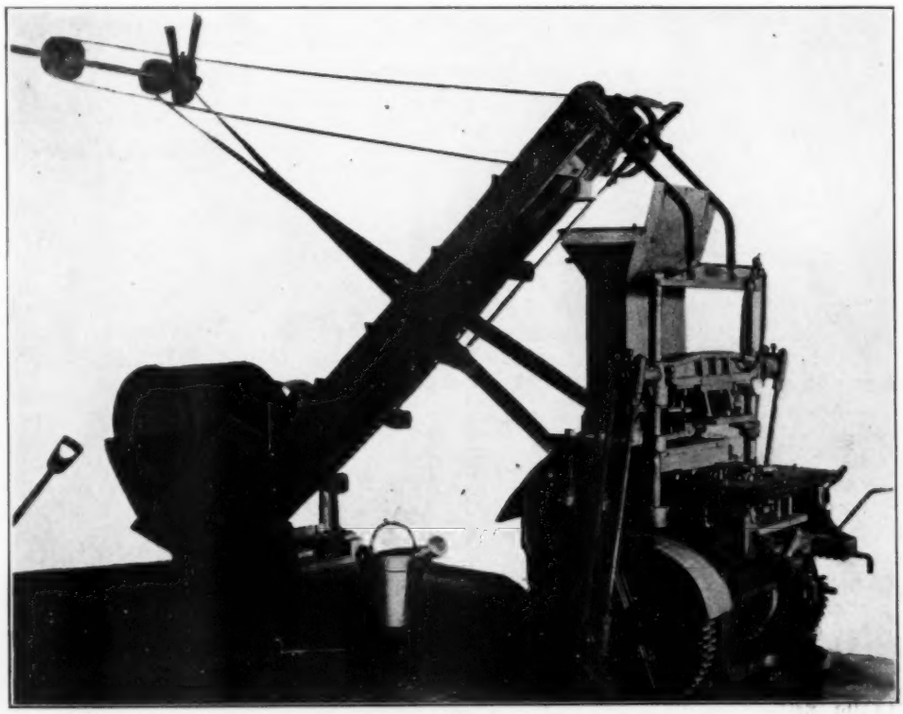
The new method provides an electroplating apparatus consisting of a receptacle of tubular shape which contains the plating solution. This is provided with a brush of sponge or other suitable material, through which the solution passes and by means of which it is applied to the surface to be plated. The anode is placed within the receptacle. Since the solution is applied to the object in sufficient quantity the deposit is made more rapidly and the work is performed more easily and without waste of the solution.

THE BERKSHIRE AUTOMATIC MOLDING MACHINE.

A machine that is now attracting a great deal of attention among foundrymen, both on account of the originality of its design and the excellence of its work, is the automatic molding machine built by the Berkshire Manufacturing Company, of Cleveland, O. The machine is automatic in the strict meaning of that term; it does not perform two or three of the operations and then depend upon the attendant to finish the work; every step in the process, even from the screening of the sand, is performed by the machine absolutely without attention on the part of the operator. All the operator is called upon to do is to put the flask and bottom board in position, throw the operating lever and in seven seconds the one-half mold is finished. The machine puts the sand in the flask, rams it, vibrates the pattern and removes the pattern from the mold, all without any assistance whatever from the attendant.

The engraving here presented shows the complete equipment, comprising the molding machine, and a sand sifter and bucket elevator for conveying the sand from the sifter to the hopper above the machine. The pattern plate is let into an ordinary table or platen at the front of the machine, and can be changed without trouble and very quickly by simply removing a few screws, the plate being accurately located by dowel pins. The flask is automatically carried to the rear, where it is filled with sand. It is then brought forward and in its travel is met by the bottom board, supported from the ram, which is forced down, thereby ramming the sand. The vibrator is immediately thrown into action, and at the same time lifting pins raise the flask off the pattern.

As the flask goes back to receive its charge of sand the bottom board is supported by suitable hooks, but as the ram comes down these hooks are drawn back so that the board remains upon the mold. All the operator has to do is to life the flask and set it to one side, blow the sand from the table by means of the air hose, when all is ready for placing the other half of the mold. The operator economizes time by placing the second half of the flask upon the machine and starting it before he starts to the floor with the half of the mold that has been completed. By the time he has placed the finished half of the mold on the floor, the second half has been completed by the machine and is ready to be lifted off and carried to the floor. When using snap flasks and making light molds the mold can be assembled by the side of the machine and only one trip made to the floor. In that case the molder can have two sets of flasks, and arrange it so that the machine will be ramming the drag for the second mold while he is carrying the first to the floor.



THE BERKSHIRE AUTOMATIC MOLDING MACHINE.

The pressure of the ram upon the sand can be quickly adjusted, and as the flasks are filled automatically, all flasks are sure to be rammed alike. It is also possible to adjust the boards in such a way that the drag will be rammed harder than the cope. When making the cope the machine is so designed that it cuts the sprue. A noteworthy point about the machine is that the pat-

tern plates are heated by gas jets from beneath, so that the molds draw readily without the use of any parting material whatever. With the use of the proper grade of molding sand, very fine work can be made in this way without any facing, and the fact that no parting sand is introduced will greatly increase the life of the sand.

That the machine has been well developed and has been accepted widely by many of the most progressive foundry managements is shown by the following brief list of the concerns now using it:

The Detroit Lubricator Company of Detroit, Mich., are making all kinds of valves and lubricators with these machines; the Metric Metal Company, Erie, Pa., are making all of the fittings for the American Meter Company; the Ohio Brass & Iron Mfg. Company, Cleveland, O., are turning out all kinds of plumbers' supplies, such as cocks, bibs, traps, etc., as are also the H. Mueller Mfg. Co., Decatur, Ill. The Eagle Brass Works, Detroit, Mich., are making plumbers' supplies, and the U. S. Bronze Company, Cleveland, O., and also the National Fulton Brass Mfg. Company, Detroit, Mich., are using the machine for journal bearings. At the present time the company are equipping the B. & O. Railway shops and also the Pennsylvania Railroad Company with machines to be used for journal bearings, injectors, etc.

NEW OIL MELTING FURNACE.

The progress which oil in brass foundry practice has been making for the past few years has fully demonstrated it to be an ideal fuel for this class of work, and a great number of oil furnaces of more or less merit have been developed.

The accompanying cut illustrates a furnace which is claimed to be foreign in principle and design to all others in that it is capable of thoroughly mixing the metal as well as providing means so that it be impossible to oxidize the metal by the admission of a superfluous amount of air. The furnace is provided with a combustion chamber of proportions requisite for the uniting of the oxygen necessary for combustion with the fuel in its passage to the furnace proper; thus obviating the difficulties of oxidizing the metal.

The body of the furnace is octagonal in form and may be easily devolved upon its bearings at the will of the operator so that after the metal has become molten, by rocking the furnace the alloys become thoroughly mixed. This prevents the heavier alloys from remaining at the bottom of the furnace; or, in other words—having the best metal at the last of the pour. The metal is, therefore, thoroughly and uniformly mixed and the difficulty heretofore experienced is obviated.

The refractory lining is made of large slabs of superior refractory material, and thus the difficulties experienced with furnaces having numerous joints (as, for example, a furnace constructed of standard fire brick) are obviated. These blocks conform perfectly to the form of the furnace and the skill of a mason is not required to place them in position. The operator can regulate the burner perfectly because the interior of the furnace can be plainly seen through the port in the journal of the furnace.

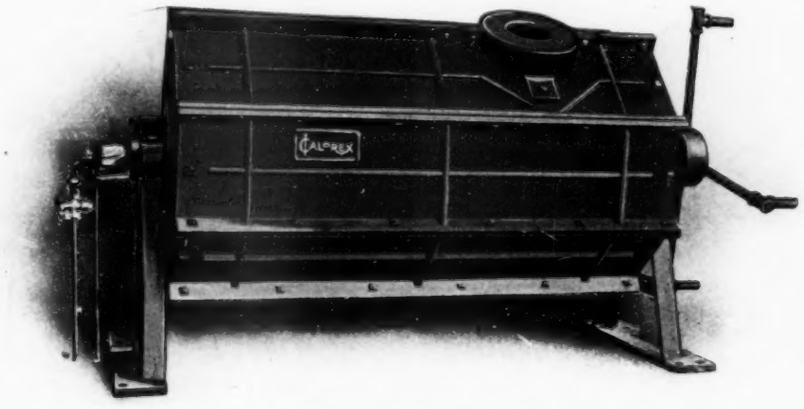
These furnaces are made of various capacities, ranging from 100 to 600 lbs. per charge, by W. N. Best American Calorific Company, 11 Broadway, New York City.

PHONO-ELECTRIC WIRE.

The Bridgeport Brass Company, 253 Broadway, New York, recognizing the demand for a conducting wire having superior physical qualities than copper, have introduced their "phono-electric" wire. This is a special copper alloy designed to give the best possible combination of strength, toughness and conductivity. For all purposes where strength, endurance and reliability are required, it is as much superior to hard-drawn copper wire as the latter is to ordinary copper wire. It is twice as strong as soft drawn copper and one and a half times as strong as the best hard-drawn copper. More remarkable than these physical characteristics are the electrical properties of the wire. Its employment in telegraph and telephone circuits has resulted in sharper and clearer signals, and in purer and more distinct tones.

SILVERWARE FOR CANADA.

According to Consul Hendrick, of Belleville, Ontario, the citizens of Canada are becoming prosperous and are buying much silverware, mostly of the plated variety. Canadian manufacturers of electroplated hollow ware have been making great strides in the improvement of their goods within the past few years and are now selling much more than half retailed in the district. The English are giving more attention to the trade and have largely increased their selling representatives during the past five years. They are paying the most attention to the better grade of goods, particularly electroplated nickel silver, which are harder, and they lay down their goods at lower prices than the Americans.



NEW OIL MELTING FURNACE.

CORRESPONDENCE

IN THIS DEPARTMENT WE WILL ANSWER ANY QUESTION RELATING TO THE NON-FERROUS METALS AND ALLOYS. ADDRESS THE METAL INDUSTRY, 61 BEEKMAN STREET, NEW YORK.

METALLURGICAL.

Q.—We notice that a number of people recommend the use of phosphorus and phosphor tin for mixtures for brass castings. Will you kindly advise us if there is any special way of using the phosphor, and is it put into the crucible before or after the melting? Our idea is to make our own phosphor copper instead of using the more expensive phosphor tin.

A.—The best results are obtained by adding phosphor tin or copper to the alloys. Phosphor copper may be added during the melting, while phosphor tin is usually put in after the melting. An excellent method of preparing phosphor copper is to use an iron crucible to the top of which is bolted a funnel. The phosphorus is placed in the crucible proper and the melted copper poured through the funnel. The vaporized phosphorus can then only escape by passing through the molten metal and in this manner is completely absorbed.

Q.—Would you please inform me what kind of metal would be best for grooves for window glass to slide in. I want a metal that will not corrode, be pliable and yet tempered so as to lay close to the glass and if possible make it air tight.

A.—Rolled strips of brass, not too hard, would probably best answer your needs. It could be bent either angle shape or U shape upon an ordinary brake by any tinsmith. The projecting parts could be made to rest snugly against the glass and, being under slight tension, would make a tight joint. Glass will slip easily on brass.

PLATING AND FINISHING.

Q.—Will you please give us a tin plating solution (electric) suitable for plating small articles such as fish hooks in a basket?

A.—It seems to us that the contact method used in coating iron pins would prove a more satisfactory plan. This consists of placing the articles on perforated zinc trays in a nearly boiling solution made up of:

Chloride of tin crystals.....	6 parts
Pyrophosphate of sodium.....	60 "
Water 3,000	"

The articles should be cleaned thoroughly. While in the hot bath they should be stirred occasionally. A good deposit can be obtained in fifteen minutes, which will adhere well. After being washed the articles should be passed through a dilute solution of plater's compound and then tumbled in fine maple saw dust.

Q.—I send you two knives that show current streaks. I have had a great deal of trouble of this kind lately and am unable to account for it. The knife blanks are finished before plating in the best possible way.

A.—Have you made a thorough examination, with a strong magnifying glass, of the unfinished knife blanks? They may contain minute pin holes which would have a tendency to produce these streaks. The best quality of cold rolled steel sometimes shows this defect. If you are sure this is not the cause of the trouble, it would be well to look to your solution. The current may be too high on account of the increased temperature of the solution due to the warm weather. This would act the same as too much cyanide, and your only remedy would be to increase the silver content slightly to overcome the too free action of the solution; or else reduce the temperature of the solution by using ice in a rubber bag This has often proved very effective.

Q.—Can you give us a formula for so-called silver cream polish?

A.—For silver cream polish dissolve in 200 parts of water 20 parts of sodium hyposulphite, 10 parts of sal ammoniac, 5 parts 26 per cent. water ammonia, and sufficient finely powdered whiting to make a paste. A small amount of nitro benzole may be added to give a pleasant odor. For color add a little peroxide of iron or rose pink dry color. This polish is non-poisonous and gives good results.

Q.—How do you brass plate trunk trimmings?

A.—Cold rolled steel and malleable iron are the materials generally used in the manufacture of brass plated trunk trimmings. It is customary to tumble the trimmings in hard wood sawdust for at least ten hours to produce a bright surface. The brass bath should be maintained at about 120 degrees. Add very little zinc to your solution when in good condition. Add principally copper and keep the color by additions of ammonia placed in the solution at the end of the day's work in the proportion of ¼ to ½ ounce to the gallon. Fifteen minutes to half an hour should be long enough to give a good plate. If the deposit is not sufficiently bright it would be well to tumble for a few minutes, using leather meal instead of sawdust.

Q.—Kindly give me a good bath to strip silver from brass and German silver by using the current.

A.—Silver plated articles made from brass or German silver cannot be successfully stripped of the silver by the current; it is better to use an acid strip. With care the articles may be stripped clean and smooth if no water is allowed in the bath by the following formula: Oil of vitriol, 1 gallon; aqua fortis, 1 pint. Heat the mixed acids in a water bath or lead coil; it acts more quickly when warm.

Q.—In preparing steel for plating I find trouble of this kind: When the work has been well cleaned and is ready to go to the bath, I find it coated with a thin film of oxide. I have tried carbonate of sodium and also cyanide of potassium without any benefit.

A.—Keep a sheet of zinc immersed in the water while the articles are in it. In the presence of iron or steel evolution of hydrogen takes place, which prevents the formation of oxide, or rusting, of the iron.

Q.—I am making a lot of novelties of 90 parts of copper and 10 parts of white arsenic, sometimes used as clock dials. I wish to oxidize the surface to the color of coin silver that has circulated, say ten years.

A.—We know of no method of oxidizing white copper to the color mentioned. A slight coat of tin would probably give you the nearest approach. Prepare a solution of:

Cream of tartar	½	lb.
Chloride of tin	1	oz.
Water	1	gal.

Use this solution slightly warm. Place the articles on a sheet of zinc, perforated to act as a sieve, and immerse for a few minutes. When slightly scratch brushed or scoured with sand, a color similar to the one desired will be produced.

Q.—I send you a sample of copper deposit. Will you tell me what makes the copper so brittle? I am using a solution made as follows:

Sulphate of copper and water. 16 deg. Baume.
Sulphuric acid ..... 2 " "

making 18 degrees in all. This bath has given good results for about six months, but suddenly deposits brittle copper. I would like to know if it needs more copper or acid as I have only added water ocassionally to make up for evaporation.

A.—Test the solution with the hydrometer and see if the density has not been impaired. If not, then add 1 to 2 per cent. more acid, which will reduce the brittleness of the deposit. If this does not give the result it will be necessary to add at least 4 ounces more of sulphate of copper to each gallon of solution. A small amount of transparent white gelatine dissolved in warm water has a beneficial effect upon acid copper deposits of unusual thickness.

Q.—In your May issue you gave the following formula for crystallized brass: Sulphate copper, 8 ounces; chloride ammonium, 4 ounces; water, 1 gallon. I have tried this; the crystals came out very faintly on cast brass and not at all on rolled brass. Can you tell me the trouble?

A.—The crystallized effect is more easily produced upon red metal castings high in copper and tin and not more than 2 per cent. of zinc, or the usual brass mixture to which should be added from 1-10 to 1-5 per cent. aluminum. The articles should be finished in the usual way as for plating, cleaned and immersed in a slightly warm solution of

Water	4	gallons
Bichromate potash	1	pound
Commercial muriatic acid	1	gallon

Dissolve the potash in the water, then add the acid. Immerse the articles until sufficiently crystalline; then wash well and pass through a solution of cyanide potassium to remove the brown discoloration. Dry out thoroughly and lacquer. The crystallized effect can also be produced in the cold ammonia copper bath, using an excess of ammonia and finishing as mentioned above.

Q.—Please give us a complete formula for a substantial, velvet-like ormolu gold finish.

A.—The production of ormolu gold finish upon soft metal alloys depends largely upon the acid copper solution. Consult the article in the May, 1905, issue of THE METAL INDUSTRY upon articles made from cast or sheet brass. The velvet-like finish is produced by the satin finish dip, afterwards burnished on the relief parts and gilded and lacquered.

Q.—Will you kindly tell me how to get rid of the acid after the gold has been cut down?

A.—Neutral chloride of gold is produced by a concentrated solution of gold in aqua regia, 3 parts hydrochloric and 1 part nitric acid. This is evaporated upon a sand or water bath until a thick syrup remains. It is well to add a small amount of water and evaporate a second time to produce a chloride free from acid. To produce fulminate of gold prepare a saturated solution of chloride of gold, and precipitate by adding 26 per cent. water ammonia until all the gold is thrown down in the form of a dark brown powder. This should be kept under water as it is violently explosive when dry. Cyanide of gold is made in the same manner except that cyanide of potassium is used as the precipitate. Much care must be used in this method as gold is very soluble in cyanide of potassium.

Q.—Some time since I bought a lot of nickel wire hooks. They looked dull, like iron, and could be lifted with a magnet. Was there any nickel in them? (2) Can dip gilding be applied to german silver? (3) Is the electrolytic deposition of tin a commercial success?

A.—Nickel, like iron, is magnetic but in a lesser degree, so this would not be a reliable test for impurities. Analyses made of nickel anodes have shown percentages as low as 75 of nickel, the remaining 25 being mostly iron. Sometimes 2 per cent. tin is added to make a softer composition. (2) German silver may be gilded by immersion in many gold dips by first passing through a dilute solution of nitrate of mercury. (3) For electro deposits of tin the following formula is claimed to give good results:

Phosphate of soda	2	ounces
Chloride of tin	1	ounce
Water	1	gallon

Use anodes of pure tin and a very low current at not more than 2 or 3 volts. It is claimed a heavy deposit can be obtained in from 20 to 30 minutes.

Q.—We want a good formula for copper plating cast iron.

A.—See formulas in the January, 1906, issue of THE METAL INDUSTRY for copper baths prepared by using red copper compound; also see the article on Acid Copper Bath in the issue of July, 1906. A good formula for copper plating may consis of

Bisulphite of soda	14	ounces
Carbonate of soda	17	ounces
Carbonate of copper	14	ounces
Cyanide of potassium 98%	17	ounces
Water	5	gallons

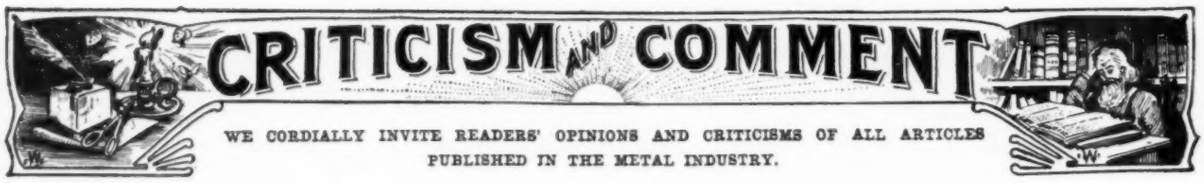
This is to be used hot or cold with anodes of sheet copper. Prepare the bath by dissolving the soda salts in part of the water and then add the copper. Dissolve the cyanide in the other part of cold water and then mix together. Although the solution should be boiled it will give good results without it.

Q.—Can you advise us if there is a formula for getting a black finish on brass castings, without copper oxidizing, plating or heating?

A.—There are very few methods of producing a black finish on brass without plating or oxidizing. The dead black upon a great many articles is made with a dead black dipping lacquer. (See article published in the May, 1905, issue of THE METAL INDUSTRY.) Another method that has lately come into use is to varnish the articles with a good turpentine copal, then smoke in a gas torch and dry in the lacquer oven.

Q.—We found by past experience that the yellow deposit in our nickel solution settled firmly at the bottom of the tub; now it floats about 4 inches from the bottom. We do not know the cause of this.

A.—Your nickel solution is probably deficient in nickel. Add two or three ounces of single sulphate of nickel to each gallon of solution in use. The addition of the nickel and the free acid obtained will be likely to produce a normal effect upon the solution.


CRITICISM AND COMMENT
WE CORDIALLY INVITE READERS' OPINIONS AND CRITICISMS OF ALL ARTICLES PUBLISHED IN THE METAL INDUSTRY.

BURNT BLACK FINISH.

To the Editor of THE METAL INDUSTRY:

Please correct the error in my formula for a Burnt Black Finish which appeared in your issue of August, page 193. It should read 1 oz. instead of 1 gal. of water.

I have had trouble with the black nickel solution mentioned by your correspondent in the July issue, page 173. The formula was as follows: "Dissolve ½ pound white arsenic and 1 pound caustic soda in 1 pint hot water; and 4 ounces sulphate of nickel in 1 pint water. Mix the two solutions and then add ¾ gallon commercial hydrochloric acid. A nickel anode should be used." The writer had the same difficulty as your correspondent as the solution plated spotted and in streaks. I found that the bath was not rich enough in metal and I therefore added some copper sulphate solution. This entirely overcame the trouble and the solution worked all right. But very little of the copper sulphate was found to be necessary.

WM. VOSS.

THE SALE OF SHEET COPPER.

To the Editor of THE METAL INDUSTRY:

In regard to the editorial on the sale of sheet copper in the July issue of THE METAL INDUSTRY we would state that we very seldom order sheet copper by stating the size and what it should weigh, although that is a method used among all the Western houses to-day. That is, a sheet of copper is said to be 30 inches x 60 inches and to weigh 96 lbs. In figuring it this leaves a very uncertain impression on the mind of the person who is buying it. In our opinion it is simply used as a means of giving a wrong impression. We never have used it and do not believe it is the right way to order it. We buy our copper either by the gauge or by the pounds to the square foot and use no other method, and have not for the past twenty years.

We have often lost work figuring against houses who use this method of giving the size of the sheet and its weight, because people who have received the figures have labored under the impression that the copper used by them has been thicker than what we have used in our figure, when really the thickness is less than that figured by us.

E. B. BADGER & SONS COMPANY.

Boston, Mass.

FIRE PROTECTION FOR DIES.

To the Editor of THE METAL INDUSTRY:

We are considering the advisability of placing our hardened steel dies in fire proof safes in order to protect them in case of fire, and also to save insurance. A question between the makers and ourselves has arisen as to whether, in case of great heat, the inside temperature of the safe would be sufficiently hot to anneal the dies. They inform us that in any case the heat would be moistened by the steam evolved from the interlining of the material. Can you inform us what temperature it would require in order to make the dies sufficiently soft that they would sink when put into the drop press.

WHOLESALE JEWELER.

This question was referred to the well known manufacturers of drop forgings and dies, J. H. Williams & Company, of Brooklyn, N. Y., who write us as follows:

"In response to your inquiry regarding dies would say that size, shape, material and the use to which these tools are to be put govern entirely the question of their being injured for practical purposes by being subjected to a high temperature. Even in our line alone, quite a variety of hardnesses are used for different work; some dies are not hardened by us at all, while much care is used in the hardening and tempering of other tools. We do not think it possible to overheat the dies in a fire to such an extent that they would be "burned," although if they are long and slender tools of small sections, the tendency would be to anneal or soften them, provided the heat reached a sufficiently high temperature, and the rehardening might then cause warping, but as this is the case in the first hardening with a great variety of tools and can be readily overcome, we should not imagine there would be a great attending amount of danger. As stated in the beginning of our letter, however, it depends entirely upon the character of the parts.

"J. H. WILLIAMS & CO."

SILVER AND ARGENTAN ALLOYS.

To the Editor of THE METAL INDUSTRY:

It may interest your readers to know that good New Silver and Argentan alloys for sand mold castings are of the following composition:

1.—Copper, 1,000 g.; nickel, 200 g.; zinc, 600 g.; manganese, 10 g.; magnesium, 3 g.

2.—Copper, 1,000 g.; nickel, 400 g.; zinc, 625 g.; manganese, 20 g.; magnesium, 5 g.

3.—Copper, 1,000 g.; nickel, 600 g.; zinc, 635 g.; manganese, 30 g.; magnesium, 10 g.

4.—Copper, 1,000 g.; nickel, 650 g.; zinc, 625 g.; manganese, 35 g.; magnesium, 15 g.

It is also well to note that the higher the nickel contents the more refractory are the copper, nickel and zinc alloys in themselves, and, for this reason, the cross cuts of the channels, as well as the gates of the mold, must be correspondingly larger. It is further necessary to slightly cool off these melting baths by adding remnants of the same kind of alloy before adding the zinc, in order to prevent the excessive burning up of the same. To prevent heat-cracks, the clamp screws must be loosened immediately after the process of casting, and care must be taken not to disturb the mold while doing this. The magnesium must be added after the melting is completed, while the crucible with its contents is taken out of the furnace and well skimmed off. By means of pincers, of iron, pure nickel or graphite, the magnesium must be pushed down to the bottom of the crucible. The correct addition of magnesium may be determined by the fact that the casting, when cold, should be of a grayish color.

C. W. LEAVITT & CO.

In our August issue we quoted platinum at $26 per troy ounce. The price at the present time is $34 per ounce. The market is advancing and higher prices may be looked for.

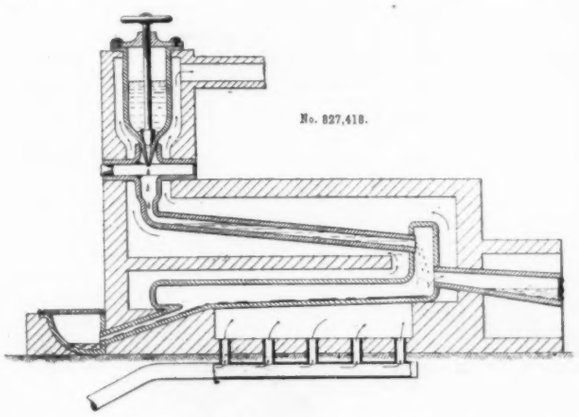
PATENTS

REVIEW OF CURRENT PATENTS OF INTEREST TO THE READERS OF THE METAL INDUSTRY.

827,975. August 7, 1906. Wire Drawing Machine. John M. Henderson, Waterbury, Conn. The main object of this invention is to firmly support the wire drawing drum from both ends and at the same time provide for the ready removal of the wire.

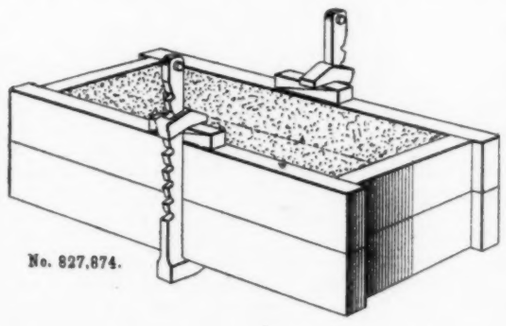
828,214. August 7, 1906. Machine for Making Sand Molds. Henry Karow, assignor to Henry E. Pridmore, Chicago, Ill. This machine is so constructed that the cope or drag of a flask after being filled and rammed with sand is removed from the filling stand with the pattern, pattern plate and accessory mechanism in situ. It is reversed in position and deposited upon what may be called the parting stand, whereupon the pattern plate and pattern are withdrawn from the sand in exact perpendicularity to the parting face.

827,418. July 31, 1906. Process of Refining Zinc and other Metals. J. Callman and R. Bormann, Berlin, Germany. This refining process is a continuous one. It is based on distillation,



and its characteristic is that the zinc is distilled while in a liquid condition and flowing in a thin stream through a pipe, which is heated and fitted with discharge pipes for the zinc vapor. The zinc vapor is condensed while the foreign metals pass into a receiving vessel.

827,874. August 7, 1906. Clamp for Foundry Flasks. Oscar F. Lindberh, Bradford, Pa. This clamp is of the adjustable



kind. The clamp is formed with two jaws, one stationary and the other movable. Ordinary foundry wedges are used with it.

827,371. July 31, 1906. Wire Drawing Machine. James A. Horton, of Providence, R. I., assignor to the Iroquois Machine Company, of New York. The objects accomplished in the design of this machine are to increase the speed of drawing, to provide a machine that can be used either on the single pass system or multiple pass or series system, and also to provide for the ready removal of the coils of wire from the drum. The machine is provided with a stop device when the wire runs out.

824,103. June 26, 1906. Alloy to Replace German Silver. Wilber B. Driver, East Orange, N. J. This is a compound of copper, nickel and manganese designed primarily for use as electric resistance to take the place, particularly, of German silver. It is composed of 75 parts copper, 20 parts nickel and 5 parts manganese. It is claimed to be permanent and stable in its physical and electrical properties.

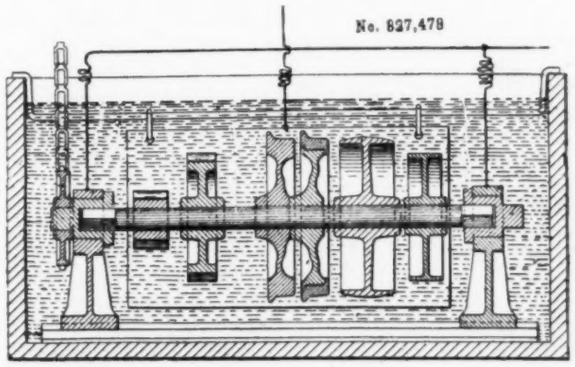
824,644. June 26, 1906. Process of Manufacturing Zinc Alloys. Paul Guhrs, Berlin, Germany. In this process the formation of hard zinc is entirely avoided, and the strong oxidation of the liquid metallic zinc is almost completely eliminated. This is accomplished by incorporating aluminum and bismuth with the zinc bath so as to be retained therein.

824,618. June 26, 1906. Alloy. Charles H. Birmingham, Baltimore, Md. This alloy is fusible only at a very high temperature, and may be used in the place of platinum in electrical appliances. It is composed of silver, 16½ ounces; Nickel, 4 1-5 pounds; bismuth, ½ ounce, and gold, 53 pennyweights.

824,965. July 3, 1906. Molding Machine. Edwin E. Waite, Philadelphia, Pa. This invention relates particularly to a pattern plate and to means for raising and lowering, as well as turning, such a plate in the machine.

826,354. July 3, 1906. Process of Manufacturing Alumina. Harry C. Peffer, East St. Louis, Ill. Assigned to the Pittsburg Reduction Company, New Kensington, Pa. In this process lime is mixed with ground bauxite, preferably in a wet state, and afterward heated in a retort to a red heat. The reaction produces calcium aluminate and calcium alumino-silicate. The proportions are about 56 parts of CaO and sufficient bauxite to yield about 102 parts of Al_2O_3 and an equal amount of CaO for every 60 parts of silica contained in the bauxite. If this product be heated with a solution of carbonate of soda, enough of the latter being employed to supply 62 parts of Na_2O to every 102 parts of Al_2O_3, the aluminate of calcium will be decomposed, forming soluble aluminate of soda, the other compounds being insoluble. The aluminate of soda can then be filtered off and the alumina extracted by the usual methods.

827,478. July 31, 1906. Apparatus for Electroplating Cylindrical Articles. Robert C. Totten, Pittsburg, Pa. In the ordinary method of electroplating in a tank, the deposition takes place practically only in a straight line from the anode to the



cathode, so that the portion of the surface which faces the anode receives a thick deposit, whereas the other portions of the article receive none, or at least very little of the coating material. The present invention overcomes this difficulty by slowly rotating the articles in the bath so that all points on the periphery of the article are presented to the anode for equal lengths of time.

828,732. August 14, 1906. Machine for Bending and Coiling Metal Ribbons. Frederick G. Frankenberg, Chicago, Ill. This machine is intended for bending and coiling metal ribbons to form flexible tubing. The operation of the machine is as fol-

lows: A ribbon of copper or soft steel is passed through a series of rolls which are so formed that they will give, by successive stages, the ribbon longitudinal bends. During this process they also bend the ribbon transversely back and forth so as to give it transverse flexibility. In addition there are other rolls which continue the work of transverse bending, while at the same time they operate to maintain the fixed longitudinal bends from distortion by transverse bending. From the finishing rolls the ribbon passes through a guide to a coiling head, where it is coiled into an interlocking helix.

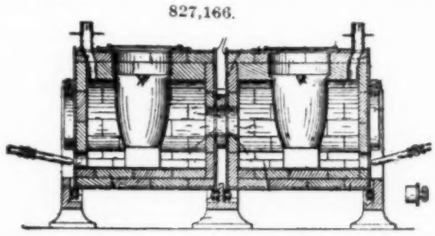
827,127. July 31, 1906. Vibrator for Molding Machines. Edwin E. Waite, Philadelphia, Pa. This vibrator is so designed that it may be connected and disconnected from the pattern plate. The time of connection of the vibrator with the pattern plate can be extended or shortened at will.

827,163. July 31, 1906. Seaming Machine for Sheet Metal Articles. B. J. Lindgren and J. Humelbuehler, assignors to the Niagara Machine and Tool Works, Buffalo, N. Y. This machine belongs to the kind used for attaching the bottoms or ends to the circular bodies of cans, tubs and the like by the well known double seam. It is suitable for joining the ends and bodies of vessels differing greatly in size. Large heavy work can be done upon it with the minimum exertion upon the part of the operator.

823,097. June 12, 1906. Apparatus for Making White Lead. J. W. Bailey, New York. The invention provides a white lead machine that is simple in construction and capable of treating a great quantity of material in a given time and space. All parts are readily accessible for cleaning and repairing.

827,166. July 31, 1906. Furnace. James V. Martin, Baltimore, Md. This furnace is a tilting furnace heated according to the regenerative principle. It is a double furnace having two chambers which are placed upon rollers and which can be tilted independently. The flues are so arranged that while the melting is being done in one furnace the waste gases pass through the other, which is heated to a considerable degree. Either oil or gas may be used for fuel.

827,166.



TRADE NEWS

TRADE NEWS OF INTEREST DESIRED FROM ALL OF OUR READERS. ADDRESS THE METAL INDUSTRY, 61 BEEKMAN STREET, NEW YORK.

The Western Novelty & Plating Works, Minna near Third street, San Francisco, Cal., will soon be ready for business.

J. G. House and T. C. Link, of El Paso, Tex., are contemplating starting a brass foundry.

Richard Thoren, of Jamestown, N. Y., is about to start a plating and polishing job shop. It is expected to do work by contract.

An order has been signed for the sale of the Globe Brass Company of Detroit, Mich., to take effect August 2.

The Acme-Keystone Mfg. Company, Beaver Falls, Pa., expect to start a modern plating plant in the near future.

The Richmond Mfg. Company, Richmond, Va., have added a complete brass foundry to their equipment.

The Eureka Brass Works, Cincinnati, O., are erecting a new building at a cost of $12,000.

The Milwaukee Smelting and Refining Company is a new enterprise which has started at Milwaukee, Wis., to smelt, refine and deal in metals. Their office and works are at 233 Oregon street.

On September 18 there will be a sale of old material at the Washington Navy Yard, including commercial brass castings, ordinary bronze cuttings, manganese bronze, foundry sweepings, etc.

Proposals will be received by the Washington Navy Yard on September 18 for a quantity of copper rivets, bonze rods, copper pipe and tubes, sheet tin, lead and zinc, and valves.

The Edwards Mfg. Company, manufacturers of sheet metal goods, has established a Pacific Coast agency with the A. C. Rulofson Company, Berkeley, Cal.

The Chas. J. Bogue Electric Company, of 213 Centre street, New York, report a heavy business in large size generators, of 1,000 amperes or more.

John Toothill, 210 Canal street, New York, a white metal roller and refiner, is busy with orders, and the fall trade finds him running his shop to its full capacity.

The two new buildings erected by Wm. Highton & Sons, of Nashua, N. H., have been completed. They will provide a brass foundry, machine shop and nickel plating plant.

The Roberts Brass Manufacturing Company, Detroit, Mich., have just moved into their new building specially equipped for the manufacturing of valves, cocks, bibbs, gauges and the like.

The Owen C. Hassler Company, of Chicago, Ill., cleaners and polishers, have removed their office to the factory at 565 West Fullerton avenue.

The Waterbury Brass Company, Waterbury, Conn., now have on process of construction an addition to their present rod mill; the contracts have all been let.

The New Jersey Aluminum Company, of Newark, N. J., recently enlarged their plant considerably and are now occupying the new building. They have 350 hands and business is very good.

The American Brass Company, through its president, has recently ordered from C. M. Dally of 29 Broadway, New York, working drawings for a Bates & Peard Bright Annealing Furnace which they are to construct for use at one of their factories.

The crucible furnaces put in by the Monarch Engineering and Manufacturing Company, of Baltimore, Md., in Cleveland and vicinity, have been very successful. They can be operated with natural gas or fuel oil.

T. B. Hagstoz, Limited, of Philadelphia, Pa., are making a specialty of silver anodes and sterling silver. They are also buyers of gold, silver and platinum and material containing these metals.

The Art Metal Construction Company, formerly in the Flood Building, San Francisco, Cal., has opened headquarters at 1163 Washington street, Oakland, Cal. These offices are only temporary as the company will shortly return to San Francisco.

The A. C. Rulofson Sheet Metal Works has been opened at San Francisco, Cal. Mr. Rulofson was for many years manager of the buying and selling department of Baker & Hamilton, wholesale hardware dealers, of San Francisco.

The Glacier Metal Company, of Richmond, Va., are sending to the trade a very neat souvenir match safe calling attention to their thoroughly reliable bearing metal for use in locomotives, engines, dynamos, rolling mills, etc.

The Electric Meter & Stamping Company, of New Hamburg, Ontario, Canada, are rebuilding their factory. The new works will have a frontage of 120 feet and a depth of 155 feet and will be equipped with modern appliances throughout.

Rib-Flasks, which are interchangeable, are the specialty of The Brass Founders Supply Company, of Newark, N. J., who sell general brass foundry equipment. Another specialty is band saws.

The American Aluminum Coating Company, of Connellsville, Pa., are now turning out absolutely perfect aluminum coated steel sheets. Tests made by the company have demonstrated it to be much superior to any other material on the market, and in many cases to be better than copper.

The Bates & Peard Patent Annealing Furnace Company, Huyton, Liverpool, England, have just received a cablegram from the Driver-Harris Wire Company, of New Jersey, for an annealing plant for their various kinds of special resistance wire, etc.

The varnishes, compositions and colors known as "Sanguines," which are especially adapted for finishing in French bronze and for which we have had a number of inquiries, are handled exclusively in the United States by Paul Uhlich & Co., 81 Fulton street, New York City.

The Dow Chemical Manufacturing Company, Mansfield, Ohio, are now offering to the trade a new red copper compound which is equal to any on the market and is offered at prices that cannot fail to interest. They are also manufacturing on a large scale carbonates and sulphates of copper and zinc as well as a complete line of the chemicals used by the electroplater.

The establishment of J. Liebstein & Son, of 33 Oliver street, Newark, N. J., dealers in iron and steel scrap and metals, was totally destroyed by fire on July 25, the loss being $3,500. There was no insurance. The firm have bought 4½ acres of land alongside the tracks of the Jersey Central Railroad where they will build immediately. In addition to their metal house they contemplate erecting a smelting and refining works.

The Standard Brass Foundry Company, of Cleveland, O., propose erecting an addition to their aluminum foundry of 60 x 70 feet, with seven additional furnaces. This foundry will then be 60 x 150 feet, 20 feet high, and will have a traveling crane through the center of the building. The building will be more than half glass, so that it will be thoroughly well lighted and ventilated.

The Automatic Card Index Company, of Utica, N. Y., is extending its equipment so as to be able to make a full line of aluminum novelties. The company has engaged C. W. Briggs, of Springfield, Mass., widely known in this line of work, as superintendent. Within a few weeks the company will be ready to make all its own dies and will have its own lathes, printing presses, etc. Dies will be made to order for stamping any kind of metal.

The name of the Norton Emery Wheel Company, of Worcester, Mass., has been changed to the Norton Company. This change was made necessary by reason of the fact that all their wheels are now made of alundum, an artificial abrasive manufactured by the company in its own plant at Niagara Falls. Alundum is produced in the electric furnace from bauxite and is very much harder than emery.

The Syracuse Smelting Works, Thirty-sixth street and Tenth avenue, New York City, have lately secured some large export orders for their phosphor tin. They also report large sales of their manganese anti-friction metal. They are the sole agents in the United States for the Montreal Copper Company, Limited, and report that they have the only copper refinery in Canada.

The Colonial Bronze and Silver Company, of Kingston, N. Y., formerly manufacturers of art metal goods, has retired from business, and the plant formerly occupied by it is now occupied by the Ornamental Bronze and Plate Company, a new concern, which is carrying on a similar business, and with whom the unfilled orders of the Colonial Company have been placed. The new company will aim to meet all the demands of the trade, and to operate the plant, which is a large and ample one, to its full capacity.

The Continental Car and Equipment Company, 17 Battery place, New York, will erect a large plant near Highland Park, Louisville, Ky. The company will have a small brass foundry for casting their own work. They make a specialty of logging cars and industrial cars of the wooden frame style. The "Steele-Harvey" brass melting furnaces, made by The Monarch Engineering and Manufacturing Company, Baltimore, Md., will be used at this plant.

The New York Lead Wool Company, of 93 Nassau street, New York, are the introducers into this country of lead wool for caulking pipe. The use of lead wool for this purpose was originally begun in Germany in 1904, and now, in addition to its German plant, the company has works at Snodland, Kent, England, and in New York. The company also makes wool of zinc, silver, copper, brass, babbitt metal and steel, in any degree of fineness required.

The National Smelting and Refining Works have moved their main office from 419 Marcy avenue, Brooklyn, N. Y., where their smelting plant and storehouse is located, to 250 Water street, New York City, where they will be nearer the metal center and be pleased to receive their patrons. The office of the National Copper Company, of Bayway, N. J., is also located at 250 Water street. The National Smelting Works act as buying agent of the Copper Company, and are in the market at all times for skimmings, grindings, sweepings and irony brass.

Louis Gaenicke, 23 Athens street, San Francisco, Cal., writes that there is a great need of a successful brick cleaning machine in that city. The ones now in use are slow and stir up too much dust. They are constructed like a buffing lathe, a circular steel brush being the means of cleaning the bricks one at a time. Mr. Gaenicke believes that the pickling method ought to be all right provided 5,000 or 10,000 bricks could be handled at one time. This would necessitate an acid proof pump. He remarks that there are millions of bricks to clean in San Francisco. Some of our machinery builders or apparatus manufacturers may care to make brick cleaning machines.

Union Iron and Brass Works, of El Paso, Tex., have bought machinery and equipments for a first class machine shop, brass foundry and blacksmith shop. They are now building shops and will soon be in readiness to accept work on general repairing and erecting machinery. They expect to manufacture from their own patterns and castings a great many machinery parts in brass of their special mixtures and will carry in stock for almost all styles of pumps used in that locality, brass valves, seats, stems and springs. They will make castings for other machine shops of bronze or composition. A stock of bronze rods of varying sizes, sheet brass and copper will be carried.

The Monarch Valve Company, of Warren, Mass., made its first casting on the 11th of last month. In describing the event the local paper says:

"In accordance with a bit of sentiment or superstition common in the business, each man employed about the works threw a cent into the receptacle containing the metal, and, in behalf of the town, that it might share in the expected good luck, two cents were given by a citizen to go with the melted metal for the first casting made by this new industry of the town. Into the crucible at the same time went also 209 pennies sent for the occasion by friends of the company and its employes from Springfield and vicinity."

San Francisco shops are getting busy. The Enterprise foundry has erected a brass foundry and is now employing from 10 to

15 molders. The Shelby Smelting Company has broken ground for its new $5,000,000 smelting plant at San Bruno Point, south of the city near the bay. There are two steam shovels and a large force of men employed. The works will have railroad and steamer connections. The Atlas Brass Works, a new concern, is putting up a big brick building on Folsom street, between 4th and 5th streets. The plant will comprise brass finishing, polishing, plating, packing and shipping departments. G. J. Higgins, formerly of the Standard, is the manager. Another new foundry, with brass finishing and polishing shops, is being built at Black Diamond, Cal., in connection with the Bowers Rubber Company, burned out by the fire and now at Oakland.

PRINTED MATTER

The quick opening steam and hot water radiator valves made by the Eureka Brass Works, Cincinnati, O., are fully discussed in a recent pamphlet.

The latest catalogue by the Atlantic Stamping Company, Rochester, N. Y., describes their large lines of galvanized iron, tin and copper wares.

A catalogue by the New England Enameling Company, 61 Beekman street, New York, deals with their enameled, plain and re-tinned stamped and galvanized wares.

The Marshalltown Trowel Company, Marshalltown, Ia., have prepared a catalogue describing their high grade plasterers' tools. Their trowels, hawks, darbies and sidewalk edgers and groovers are made of aluminum.

"Technical Thermometry" is the title of a catalogue by the Cambridge Scientific Instrument Co., of Cambridge, Eng. It describes the several types of instruments made by the company for obtaining accurate temperature measurements.

Mention is made by the Aluminum Cooking Utensil Company, of Pittsburgh, Pa., in their catalogue No. 7, of their wide line of articles made of aluminum, such as kettles, waffle irons, pans, broilers, tea and coffee pots, cups, chafing dishes, etc.

The 1906 catalogue of the Brown & Sharpe Mfg. Company, of Providence, R. I., deals with their machine tools, milling cutters and their wide range of measuring instruments.

Catalogue No. 67 of the C. Sidney Shepard & Company, St. Louis, Mo., is a large volume of over 500 pages describing their extended lines of tin ware, cans, pails, enameled goods, tin plates and tinners' tools and supplies.

A large catalogue for buyers of foundry facings and supplies, and polishers' and platers' supplies, has been issued by Frederic B. Stevens, of Detroit, Mich. The book contains 225 pages, 6 x 9 in size, and covers every material and tool required in the brass and iron foundry and plating shop. A copious index provides convenient reference.

The Dow Chemical Manufacturing Company is issuing a series of bulletins which are sent to the trade upon request. The bulletins include "E" covering anodes and electroplaters' chemicals, "A" relating to dynamos and "D" to tanks. The circular matter is concise and handy for reference in buying platers' supplies.

The Forbes Silver Company, of Meriden, Conn., have prepared a very large catalogue showing many of their new designs in silver plated ware. Those particularly noticeable are their engraved and chased English ware. There is also shown a wide assortment of the more staple sets and pieces, the whole making a selection covering everything needed in the stock of the dealer selling silver plated goods.

The last catalogue issued by W. W. Lindsay & Company, Harrison Building, Philadelphia, Pa., lists the various standard Lindsay foundry chaplets and anchors carried in stock, as well as numerous special chaplets intended to meet requirements of work of an unusual character. These chaplets are made of the best soft steel. Their advantages and method of manufacture are described in the catalogue.

"Through 'Frisco's Furnace" is the title of a very elegant and unique pamphlet by the Joseph Dixon Crucible Company, of Jersey City, N. J. The engravings are well selected and show the effect of the earthquake and fire on some of the typical buildings of the city. The manner in which Dixon's silica-graphite paint preserved the strength of steel work of the high buildings is shown in the reports.

The knives made by the E. H. H. Smith Silver Company, Bridgeport, Conn., are of silver-nickel. This is a non-rustable metal, silvery white through and through and affords the best base for silver plating. Inserted along the entire length of the cutting edge is a very thin steel strip. This is so set that it does not visibly project beyond the edge of the blade, but it is exposed in sharpening just enough to secure the cutting quality of a steel knife.

A few months since the entire plant of Zucker & Levett & Loeb Company, 516 to 524 West 25th street, New York City, manufacturers, exporters and importers of electroplaters' supplies, polishing materials and dynamos, was destroyed by fire. With their usual energy the company immediately made arrangements to continue the business in buildings in the neighborhood of their old works. That their printing facilities have completely recovered from the effects of the fire is shown by a very handsome catalogue, just received, of some 225 pages. The catalogue comprises a full list of polishing and plating machinery and supplies, describes each article as fully as possible and states how the same should be used. The company have recently put on the market their new type SH plating dynamos, which embody all the modern improvements known to electrical science, and in the construction of which no expense in material or workmanship has been spared.

INCORPORATIONS

The Art Metal Shops, Saco, Me., have been incorporated by G. A. Moore and L. R. Moore.

The Art Metal Goods Manufacturing Company, New York, has been incorporated with a capital of $12,000.

The Elkhart Brass Manufacturing Company, Elkhart, Ind., have increased their capital from $12,500 to $25,000.

The Miami Brass Foundry Company, of Dayton, O., have been incorporated by B. Semelman, H. A. Stier, J. Friedman, A. Semelman and S. Flaton.

The American Brass & Aluminum Works of Indianapolis, Ind., have been incorporated with a capital of $10,000 by F. Sattley, W. J. Tingle and H. Taylor.

The Virginia Zinc Company, of Superior, Wis., has been incorporated with a capital of $10,000 by J. B. Arnold, E. A. Arnold, D. Linscott and G. H. Winsor.

The Sunny Side Lead & Zinc Company, Milwaukee, Wis., has been incorporated with a capital of $100,000 by Alfred A. Krez, Otto J. Koch and Adam Mayer.

The Syracuse Aluminum & Bronze Company, of Syracuse, N. Y., has certified to the Secretary of State that the full amount of the capital, $20,000, has been paid up.

The Woonsocket Supply Company, of Woonsocket, R. I., has been incorporated with a capital of $10,000 fully paid. The company will manufacture steam and plumbers' supplies.

The Prier Brass Mfg. Company, of Kansas City, Mo., has been incorporated with a capital of $40,000 all paid. The incorporators are Adolph A. Prier, Walter H. Prier and Ernest Durst.

The Brass Specialties Company, of New York City, has been incorporated with a capital of $50,000 by W. H. Wadhams, R. W. White, A. W. Putnam, all of New York City. The company will manufacture lamps, candle holders, shades, etc.

The D. T. Williams Valve Company, Cincinnati, O., have increased their capital from $100,000 to $200,000. They will in-

crease their facilities by the erection of a new four story plant 125 x 247 feet, of concrete construction. The addition was demanded by their rapidly growing business.

The Miami Brass Foundry, of Dayton, O., have been incorporated with a capital of $10,000 by Benjamin and Abe Semelman, Herman A. Stein and Joseph Medman. The company are building a brick foundry 125 x 35 feet, two stories high. It will be equipped to handle all kind of brass and aluminum work.

A certificate of incorporation has been obtained by the Ellis Manufacturing Company, of Southington, Conn. The authorized capital is $50,000 and the company will begin with $20,000. The business will be the manufacture of articles of iron, steel, brass and copper. The incorporators are Frederick L. and Frederick M. Grace, Edith R. and Julia A. Ellis.

The Penna. Auto Metal Body Manufacturers, of Reading, Pa., have been incorporated with a capital of $250,000. The officers are: President, Irvin G. Shanaman; vice-president, George W. Stevenson; secretary-treasurer, Isaac G. Shanaman. The company is looking for a suitable location for their plant, the present quarters being much too small. Although the business has been established but two months it is impossible to fill orders and all departments are rushed. The bodies made by the company are of aluminum and steel.

FINANCIAL

The report of the American Smelting and Refining Company, issued Sept. 5, at the annual meeting in Jersey City, shows net earnings for the fiscal year, ending April 30 last, of $10,101,368, an increase of $1,262,546, 14.2 per cent, over those of 1905. This showing is made despite the deduction from the year's profits of $1,766,681 paid for new plants and properties, betterments, repairs, and improvements, and without taking into account the earnings from the mining properties of the company or the earnings on the stocks of the American Smelters Securities Company, the United States Zinc Company, and the United Lead Company, which it holds, nor the income from the use of patents. Out of this income dividends of $6,750,000 have been paid on the $100,000,000 of capitalization. This sum includes an increase of $750,000 in the distribution on the common stock, leaving a surplus for the year of $2,024,054, compared with $1,618,911, for 1905.

PERSONALS

C. W. Briggs, of Springfield, Mass., has accepted the position of superintendent of the Automatic Card Index Company, of Utica, N. Y. Mr. Briggs has had charge of the largest aluminum novelty establishments in the country.

D. E. Hunihan, formerly of New York and at present foreman of the polishing and nickel plating room of the Westinghouse Electric and Manufacturing Company, Pittsburg, Pa., is a candidate for the Assembly from the 11th Legislative District, Pennsylvania.

Henry Stanley Renaud, B.S., LL.B., of Waller & Renaud, consulting chemists, 159 Front street, New York, has been admitted to the bar of the State of New York. In connection with his work as chemist Mr. Renaud will devote his attention to techno-legal questions and patent cases.

DEATHS

Joshua Regester, for many years engaged in bell casting and brass foundry work, and who made a large portion of the church bells now in use throughout the United States, died at Baltimore, Md., July 31, in his ninetieth year. He was born in Maryland in 1816 and at first worked on a farm. When he was 16 years old he entered the employ of the Sharrer Brass Works of Baltimore. After learning all the details of the business he organized, in 1844, the brass founding firm of Clampett & Webb which afterward became Regester & Webb, then Joshua Regester and finally J. Regester & Sons. He retired from the firm in 1884, when the corporation of J. Regester's Sons Company was formed, and which now occupies a prominent position in the manufacture of plumbers' supplies. Mr. Regester left a widow and four children.

METAL MARKET REVIEW

New York, September 10, 1906.

COPPER.—The London copper market has steadily advanced during the month and prices for standard copper are about £3 10s. higher than a month ago. Stocks of copper continue to decrease according to the European statistics. The visible supply of copper on August 31 was 470 tons less than on the 15th of the month.

In the New York market all records have been passed and the usual summer dullness has given place to an unusual activity tons and the total exports for the eight months this year are from all quarters for copper. The foreign demand has been heavy and the principal feature of this foreign buying has been the demand for quick shipment and for which buyers had to pay a premium of 15 to 25 points over later deliveries. The exports so far reported for the month of August foot up 20,033 140,107 tons, against 170,971 tons for same period last year. The market to-day is very strong at 18⅞ to 19 cents for Lake and Electrolytic and for any delivery this year 18¾ is bid for round lots, so that the market is fairly on a 19 cent basis and a further advance is said to be more than likely. This activity in copper is reflected in the pig iron market, spot iron is very scarce and brings a premium of 50 cents to 75 cents per ton and heavy sales of iron have been made for next year's delivery. The output of iron can be increased slightly, but it is a question if the output of copper can. As it is production has probably increased about 5 per cent, while consumption has increased about 15 per cent. The sales of copper during the month have been very heavy and the insistent demand has forced prices about ½ cent per pound higher than at the opening. We quote the market very strong at 18⅞ to 19 cents for Lake and Electrolytic and 18½ to 18¾ for good casting brands, carload lots.

TIN.—London prices have advanced about £14 per ton during the month, while America has not been a very active buyer and the demand from this side has not been heavy. Mail advices from London are all very bullish, based mostly on reports from this side on the general activity in iron and steel and copper. London opened at £170 15s. and steadily advanced to £184 17s. 6d. at the close.

In the New York market prices have been very irregular. Owing to a scarcity of spot tin holders were able to get a premium of over half a cent per pound for quick shipment against arrivals later in the month. The total arrivals for the month were 3,198 tons, while the deliveries are estimated at 3,100 tons. The market to-day is steady at 40½ cents for 5 and 10 ton lots and 40.65 for smaller lots.

LEAD.—The feature in the foreign lead market has been the steady advance in price. London opened at £16 12s. 6d. and closed at £17 12s. 6d., showing an advance of £1 for the month.

The New York market has held firm at 5.75 as the Trust shipment price, while the actual market price for spot lead is 5.85 to 5.90. It is more than likely that the Trust will advance prices very shortly. Consumers have no possible means of protecting themselves, but will have to pay the advance whenever the Trust believes the foreign market is sufficiently high to enable them to put on the screws.

SPELTER.—London price has advanced 15s. during the month.

The New York market has been dull and uninteresting. Prices in St. Louis have ranged from 5.90 to 5.95 and consumers have been fairly good buyers. We quote the market to-day 6 to 6.10 New York, carload lots.

ALUMINUM.—No further change in prices from the advance recorded in these columns a month ago. The manufacturers are still from six to ten months behind on orders, but have hopes of catching up with the market early in 1907.

SILVER.—London opened at 30 1-16d., touched 29⅞d. and closed at 30⅞d.

The feature in the silver market in New York during the month was the government buying and the market is inclined to be stronger.

SHEET METALS.—The brass and copper prices remain unchanged, but an advance is expected in the course of a week as the copper market is strong and the available supply is bought up.

OLD METALS.—The old metal market has been fairly active,

but prices have not kept pace with the advance in copper and some dealers are disappointed. However, the demand for all kinds of copper scrap is good and prices are likely to work up gradually. Zinc dross has been dull with no foreign demand at better than 4.75 to 4.80. At this price considerable business could be put through, but holders ask 4.85 to 4.90.

TRADE WANTS

AN EXCHANGE FOR THE WANTS OF THE METAL TRADES.

Advertisements will be inserted under this head at 30 cents per line, 4 lines one dollar, for each insertion. Answers sent in our care will be forwarded.

FOR SALE

FOR SALE—Three P. & W. AUTOMATIC SCREW MACHINES. Not having further use for them will sell reasonable. Also one new 128" x 16" pulley, A. & F. BROWN make. For further particulars address BOX 1036, WATERUBRY, CONN.

FOR SALE—Two EZRA SAWYER MAGNETIC METAL SEPARATORS, in good condition. Address SAWYER, care THE METAL INDUSTRY.

FOR SALE—PROCESS OF BLACK OXIDATION of Iron and Steel. A method of rapidly oxidizing iron and steel in durable deep black color. For further particulars address HENRI RYCHNER, ZURICH III, SWITZERLAND.

FOR SALE—5 to 10 tons prime remelted SPELTER; also 5,000 pounds TERNE METAL. Quotations upon application. Address P. McLAUGHLIN'S SONS COMPANY, 230-236 North Twelfth street, Brooklyn, N. Y.

FOR SALE—German Silver Scrap, mostly in the form of sheets, viz.:

14,710 lbs. 10 per cent.;
8,000 lbs. 16 per cent.;
6,339 lbs. 18 per cent.

Good clean scrap. Address stating price offered, GERMAN SILVER SCRAP, care THE METAL INDUSTRY.

SITUATIONS OPEN

Wanted---PLATER to take charge of a Plating Plant in a large factory. Must be a first-class man, able to finish Spelter, Black metal, Britannia, Brass and Copper Goods. Very good pay to competent man. State where employed for the last ten years and kind of goods manufactured. Address ENERGY, care THE METAL INDUSTRY.

WANTED—GOLD AND SILVER PLATER on fine job work. Only sober and reliable experts that can invest a few hundred dollars in a western modern job shop, established 9 years. An excellent chance for a reliable hustler and expert. Enclose references which will be treated confidentially and returned. Address RELIABLE, METAL INDUSTRY.

WANTED—ELECTRO-PLATER for large shop doing principally cyanide, acid, copper and nickel work. Must be up-to-date and a hustler. State references and salary expected. Address DUPLEX, care THE METAL INDUSTRY.

WANTED—Man to take contract in brass finishing plant makign plumbers' supply work, to handle from 12 to 15 hands. Address, stating age and experience, BRASS MANUFACTURER, care THE METAL INDUSTRY.

WANTED—BRASS FOUNDRY FOREMAN for factory in Brooklyn, N. Y. Good opening for man who can take full charge, is a good molder and metal mixer and accustomed to molding machines. Address, stating experience and salary expected, M. B., care THE METAL INDUSTRY.

WANTED—Capable, energetic and experienced molder for FOREMAN in brass foundry. Good opportunity for an up-to-date man capable of handling men to advantage, familiar with modern foundry facilities and machinery; who understands mixtures and can show results. Salary $25.00 per week. Address RESULTS, care THE METAL INDUSTRY.

SITUATIONS OPEN—Continued

WANTED—MAN with references who understands the manufacturing and refining business. None but an experienced man need apply. Address REFINERY, care THE METAL INDUSTRY.

WANTED—FOREMAN for small brass and copper foundry. Give age, experience and salary expected. Address FOREMAN, care THE METAL INDUSTRY.

WANTED—FOREMAN MOLDER for brass foundry. Must be thoroughly up on mixtures and able to handle men and turn out work. Give references and salary expected. Address ALUMINUM, care THE METAL INDUSTRY.

WANTED—Experienced man for the manufacture of all grades of white metals. Address WHITE METALS, care THE METAL INDUSTRY.

WANTED—ENERGETIC BUSINESS MAN with capital to finance hardware manufacturing plant near San Francisco, Cal. A1 proposition. Address MR. E. R. S., Richmond P. O., Cal.

WANTED—A Pompeian or Acid Green FINISHER on gas portable work made from brass and plated metal. Address PORTABLE, care THE METAL INDUSTRY, 61 Beekman street, New York City.

SITUATIONS WANTED

SITUATION WANTED—PLATER who can furnish best of reference. For further information address S. CREIGHTON CATLIN, 14 Walnut Terrace, Bloomfield, N. J.

SITUATION WANTED—AS SUPERINTENDENT or similar position. Have had over 20 years experience in working brass. Familiar with costs, selection of machinery, handling of men and up-to-date methods in novelties, electric fittings, lamps and burners. Address E. B. W., care THE METAL INDUSTRY.

SITUATION WANTED—First class BRASS MAN with 12 years experience in both steam and plumbing supplies is open for engagement as MANAGER. Address MANAGER, care THE METAL INDUSTRY.

MISCELLANEOUS WANTS

We have little need of a laboratory. To help pay our chemist will accept brass, white metals and drosses. Cheap. TAZEWELL WHITE LIME WORKS, North Tazewell, Virginia.

CASH PAID for old precious metals and minerals in any form. Gas mantle dust, bronze powder, bismuth, platinum, mercury, nickel, etc. Address JOSEF RADNAI, 32 Fulton street, New York City.

INFORMATION BUREAU

Subscribers intending to purchase metals, machinery and supplies and desiring the names of the various manufacturers and sellers of these products can obtain the desired information by writing to THE METAL INDUSTRY. Our Information Bureau is for the purpose of answering questions of all kinds. Send for circular.

OFFICE HEADQUARTERS

When visiting New York, the out-of-town friends of THE METAL INDUSTRY are invited to make our office their headquarters, where a writing desk and telephone service will be at their disposal. Every one interested in the non-ferrous metals and alloys is invited to call.

Metal Prices, September 10, 1906

METALS.	Price per lb.
COPPER, PIG, BAR AND INGOT AND OLD COPPER	
Duty Free. Manufactured 2½c. per lb.	
Lake, car load lots	19.00
Electrolytic, car load lots	18.85
Casting, car load lots	18.65
TIN—Duty Free.	
Straits of Malacca, car load lots	40.50
LEAD—Duty Pigs, Bars and Old 2⅛c. per lb.; pipe and sheets 2½c. per lb.	
Pig Lead, car load lots	5.80
SPELTER—Duty 1½c. per lb.	
Western car load lots	6.10
ALUMINUM—Duty Crude, 8c. per lb. Plates, sheets, bars and rods 13c. per lb.	
Small lots	39.00
100 lb lots	37.00
Ton lots	36.00
ANTIMONY—Duty ¾c. per lb.	
Cooksons, cask lots	25.00
Hallets, cask lots	24.00
Other, cask lots	23.00
NICKEL—Duty 6c. per lb.	
Large lots	.45 to .50
Small lots	.50 to .65
MANGANESE—Duty 20%	.70
MAGNESIUM—Duty Free	$1.50 to $1.60
BISMUTH—Duty Free	1.60 to 1.70
CADMIUM—Duty Free	1.50 to 1.60
	Price per oz.
GOLD—Duty Free	$20.67
SILVER—Duty Free	.64¾
PLATINUM—Duty Free	34.00
QUICKSILVER—Duty 7c. per lb. Price per flask	4.00

OLD METALS.	Price per lb.	
Heavy Cut Copper	16.50	17.00
Copper Wire	16.50	16.75
Light Copper	15.00	15.50
Heavy Mach. Comp.	15.00	15.50
Heavy Brass	11.00	11.50
Light Brass	9.00	9.50
No. 1 Yellow Brass Turnings	10.00	11.00
No. 1 Comp Turnings	12.00	13.00
Heavy Lead	5.40	5.50
Zinc Scrap	4.25	4.75
Scrap Aluminum, sheet, pure	25.00	29.00
Scrap Aluminum, cast, alloyed	20.00	25.00
Scrap Aluminum, turnings	10.00	12.00
Old Nickel	15.00	25.00
No. 1 Pewter	26.00	27.00

	Price per lb.
SILICON COPPER, according to quantity	.36 to .38
PHOSPHOR COPPER, 5%	.24 to .26
Phosphor Tin	.45 to .46
Brass Ingot, Yellow	.13 to .14
Brass Ingot, Red	.15 to .18
Bronze Ingot	.15 to .17
Manganese Bronze	.20 to .22
Phosphor Bronze	.20 to .23

ZINC—Duty, sheet, 2c. per lb.	Price per lb.
600 lb. casks	8.25
Open casks	8.75

PHOSPHORUS—Duty 18c. per lb.	
According to quantity	.40 to .60

PRICES OF SHEET COPPER.

SIZES OF SHEETS.		96oz. & over 75 lb. sheet 30x60 and heavier	64oz. to 96oz. 50 to 75 lb. sheet 30x60	32oz. to 64oz. 25 to 50 lb. sheet 30x60	24oz. to 32oz. 18¾ to 25 lb. sheet 30x60	16oz. to 24oz. 12½ to 18¾ lb. sheet 30x60	14oz. and 15oz. 11 to 12½ lb. sheet 30x60
		CENTS PER POUND.					
Not wider than 30 ins.	Not longer than 72 ins.	23	23	23	23	23	24
	Longer than 72 ins. Not longer than 96 ins.	23	23	23	23	23	24
	Longer than 96 ins.	23	23	23	23	23	25
Wider than 30 ins. but not wider than 36 ins.	Not longer than 72 ins.	23	23	23	23	23	25
	Longer than 72 ins. Not longer than 96 ins.	23	23	23	23	23	25
	Longer than 96 ins. Not longer than 120 ins.	23	23	23	23	24	26
	Longer than 120 ins.	23	23	23	24	25	
Wider than 36 ins. but not wider than 48 ins.	Not longer than 72 ins.	23	23	23	24	25	27
	Longer than 72 ins. Not longer than 96 ins.	23	23	23	24	26	28
	Longer than 96 ins. Not longer than 120 ins.	23	23	23	25	27	31
	Longer than 120 ins.	23	23	24	26	29	
Wider than 48 ins. but not wider than 60 ins.	Not longer than 72 ins.	23	23	23	24	26	29
	Longer than 72 ins. Not longer than 96 ins.	23	23	23	25	27	32
	Longer than 96 ins. Not longer than 120 ins.	23	23	24	26	29	
	Longer than 120 ins.	24	24	25	27	31	
Wider than 60 ins. but not wider than 72 ins.	Not longer than 96 ins.	23	23	24	26	31	
	Longer than 96 ins. Not longer than 120 ins.	23	23	25	28	33	
	Longer than 120 ins.	24	24	26	31		
Wider than 72 ins. but not wider than 108 ins.	Not longer than 96 ins.	24	24	26	29		
	Longer than 96 ins. Not longer than 120 ins.	25	25	27	30		
	Longer than 120 ins.	26	26	28	32		
Wider than 108 ins.	Not longer than 132 ins.	27	27	29			
	Longer than 132 ins.	28	28	31			

Rolled Round Copper, ⅜ inch diameter or over, 23 cents per pound. (Cold Drawn, Square and Special Shapes, extra.)

Circles, Segments and Pattern Sheets three (3) cents per pound advance over prices of Sheet Copper required to cut them from.

All Cold or Hard Rolled Copper, 14 ounces per square foot and heavier, one (1) cent per pound over the foregoing prices.

All Cold or Hard Rolled Copper, lighter than 14 ounces per square foot, two (2) cents per pound over the foregoing prices.

Cold Rolled and Annealed Copper, Sheets and Circles, wider than 17 inches, take the same price as Cold or Hard Rolled Copper of corresponding dimensions and thickness.

All Polished Copper, 20 inches wide and under, one (1) cent per pound advance over the price for Cold Rolled Copper.

All Polished Copper, over 20 inches wide, two (2) cents per pound advance over the price for Cold Rolled Copper.

Planished Copper, one (1) cent per pound more than Polished Copper.

Cold Rolled Copper prepared suitable for polishing, same prices and extras as Polished Copper.

Tinning Sheets, on one side, 3½c. per square foot.

For tinning both sides, double the above price.

For tinning the edge of sheets, one or both sides, price shall be the same as for tinning all of one side of the specified sheet.

Metal Prices, September 10, 1906

Net Cash Prices.

COPPER BOTTOMS, PITS AND FLATS.

14 oz. to square foot, and heavier, per lb.....27c.
12 oz. and up to 14 oz. to square foot, per lb.....28c.
10 oz. and up to 12 oz.....30c.
Lighter than 10 oz.....33c.
Circle less than 8 in. diam., 2c. per lb. additional.
Circles over 13 in. diam. are not classed as Copper Bottoms.
Polished Copper Bottoms and Flats, 1c. per lb. extra.

PRICE LIST FOR ROLL AND SHEET BRASS.

Prices are for 100 lbs. or more of Sheet Metal in one order.

Brown & Sharpe's Gauge the Standard.

Common High Brass	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.
Wider than and including	2 12	12 14	14 16	16 18	18 20	20 22	22 24	24 26	26 28	28 30
To No. 20 inclusive..	.22	.23	.25	.27	.29	.31	.33	.36	.39	.42
Nos. 21, 22, 23 and 24	.22	.24	.26	.28	.30	.32	.34	.37	.40	.43
Nos. 25 and 26.....	.23	.24½	.27	.29	.31	.33	.35	.38	.41	.44
Nos. 27 and 28.....	.23	.25	.28	.30	.32	.34	.36	.39	.42	.45

Add ½ cent per lb. additional for each number thinner than Nos. 28 to 38, inclusive.

Add 7 cents per lb. for sheets cut to particular lengths, not sawed, of proportionate width.

Add for polishing on one side, 40 cents per square foot; on both sides, double this price.

Brazing, Spinning and Spring Brass, 1 cent more than Common High Brass.

Extra Quality Brazing, Spinning and Spring Brass, 2 cents more than Common High Brass.

Low Brass, 4 cents per lb. more than Common High Brass.

Gilding, Rich Gold Medal and Bronze, 7 cents per lb. more than Common High Brass.

Discount from list 17½ per cent for orders of over 5,000 lbs. per year. For orders of less than 5,000 lbs. per year, 12½ per cent.

PRICE LIST FOR BRASS AND COPPER WIRE.

BROWN & SHARPE'S GAUGE THE STANDARD.	Com. High Brass.	Low Brass.	Gilding Bronze and Copper.
All Nos. to No. 10, Inc.....	$0.23	$0.27	$0.28
Above No. 10 to No. 16.....	.23½	.27½	.28½
Nos. 17 and 18.....	.24	.28	.32
" 19 and 20.....	.25	.29	.33
No. 21.....	.26	.30	.34
" 22.....	.27	.31	.35
" 23.....	.28	.32	.36
" 24.....	.30	.34	.38

Discount from list 15 and 2½ per cent for orders of over 5,000 lbs. per year. For orders of less than 5,000 lbs. per year, discount 12½ per cent.

PRICES FOR SEAMLESS BRASS TUBING.

From 1¼ in. to 3½ in. O. D. Nos. 4 to 13 Stubs Gauge, 22c. per lb.
Seamless Copper Tubing, 25c. per lb.

For other sizes see Manufacturers' List.

PRICES FOR SEAMLESS BRASS TUBING Iron Pipe Sizes.

Iron Pipe size.	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4	4½	5	6
Price per lb..	30	29	24	23	22	22	22	22	22	22	22	23	24	26	28	29

BRAZED BRASS TUBING.

Brown & Sharpe's Gauge the Standard.

	Per lb.
Plain Round Tube, ¾ in. up to 2 in., to No. 19, inc.....	$0.35
" " " ⅞ " " ⅞ " " 19, "	.36
" " " 1 " " 1 " " 19, "	.38
" " " 1⅛ " " 1⅛ " " 19, "	.41
" " " 1¼ " " 1¼ " " 19, "	.48
" " " 1⅜ " " 1⅜ " " 19, "	.65
" " " 1½ " " 1½ " " 19, "	1.00
" " " 1⅞ " " 1⅞ " " 19, "	1.50
Smaller than ⅛ inch.....	Special
2 inch to 3 inch, to No. 19, inclusive.....	.38
3 inch	.40
Over 3 inch to 3½ inch.....	.45
Over 3½ inch.....	.50

Bronze and copper advance 3 cents. Discount from list 25 and 5 per cent for orders of over 5,000 lbs. per year. For orders of less than 5,000 lbs. per year, discount 25 per cent.

PRICE LIST FOR SHEET ALUMINUM—B. & S. Gauge.

Wider than and including	*3in. 12in. in coils.	6in. 14in.	14in. 16in.	16in. 18in.	18in. 20in.	20in. 24in.	24in. 30in.	30in. 36in.	36in. 40in.	Cutting to Length.	Polishing or Satin Finishing one Side.
W. 13 and heavier..	45	45	47	47	47	47	50	50	50	1	2
" 14.....	45	45	47	47	47	47	50	50	50	1	2
" 15.....	45	45	47	47	47	47	50	50	50	1	2
" 16.....	45	45	47	47	47	47	50	50	50	1	2
" 17.....	45	45	47	47	47	47	50	50	50	1	3
" 18.....	45	45	47	47	47	47	50	50	53	1	3
" 19.....	45	45	47	47	47	47	50	51	54	1	4
" 20.....	45	47	47	47	47	49	52	53	55	1	4
" 21.....	45	49	49	49	49	51	54	55	61	2	5
" 22.....	45	49	49	49	51	51	54	58	62	2	5
" 23.....	45	49	49	49	51	51	54	60	63	2	6
" 24.....	45	49	51	53	53	53	56	62	65	2	6
" 25.....	47	50	52	54	54	54	57	64	68	2	7
" 26.....	47	50	53	57	57	57	62	66	72	2	8
" 27.....	47	51	55	59	59	60	65	69	75	2	10
" 28.....	47	51	57	59	60	60	67	73	78	2	11
" 29.....	49	52	59	61	63	63	72	78	83	2	13
" 30.....	49	53	61	63	67	73	80	83	88	2	15
" 31.....	52	56	64	67	72	80	83	86	92	3	17
" 32.....	54	58	66	70	78	86	93	99	104	3	19
" 33.....	56	60	69	74	82	93	100	109	119	3	21
" 34.....	59	64	71	79	87	100	112	119	129	3	23
" 35.....	..	74	79	89	99	109	124	134	..	..	.. *
" 36.....	..	80	99	109	124	129	144	..	..	..	..
" 37.....	..	107	117	132	147	162	177	..	..	..	..
" 38.....	..	127	142	157	172	187	207	..	..	..	..
" 39.....	..	147	167	187	207	227	..	..	..	..	..
" 40.....	..	177	207	227	247	..	..	..	..	..	..

*Polished or scratch brushed 2 sides, double above prices.

In flat rolled sheets the above prices refer to lengths between 2 and 8 feet Prices furnished by the manufacturers for wider and narrower sheet. All columns except the first refer to flat rolled sheet. Prices are for 50 lbs. or more at one time. Less quantities 5c. lb. extra. Charges made for boxing.

PRICE LIST OF SEAMLESS ALUMINUM TUBING—STUBS' GAUGE.

Stubs' G.	¼"	⅜"	½"	⅝"	¾"	1"	1½"	2"	2½"	2¾"
4 to 11....	..	..	96	86	83	77	67	61	61	61
12.....	..	1.08	96	86	83	77	67	61	61	61
13.....	..	1.08	96	86	83	77	67	64	64	64
14.....	..	1.08	96	86	83	77	67	64	64	64
15.....	..	1.12	96	89	86	80	70	67	67	67
16.....	..	1.15	99	93	89	83	70	70	70	70
17.....	..	1.18	1.02	96	93	86	73	73	73	73
18.....	1.85	1.24	1.05	99	93	86	77	77	77	80
19.....	1.88	1.28	1.08	1.02	99	93	83	80	80	83
20.....	1.95	1.31	1.15	1.08	1.05	99	89	86	86	89
21.....	2.01	1.37	1.21	1.15	1.12	1.05	99	93	93	96
22.....	2.17	1.44	1.24	1.18	1.15	1.08	1.05	99	1.05	1.05
23.....	2.33	1.50	1.31	1.24	1.21	1.15	1.15	1.08	1.15	1.15
24.....	2.48	1.60	1.37	1.31	1.28	1.18	1.21	1.21	1.24	..
25.....	2.65	1.69	1.47	1.37	1.34	1.28	1.34	..	..	..

Prices are for lots of 50 lbs. Boxing extra. Smaller, larger and intermediate sizes furnished by manufacturers.

PRICE LIST FOR ALUMINUM ROD AND WIRE—B. & S. GAUGE.

Diameter B. & S. G'ge.	0000 to No. 10.	No. 11.	No. 12.	No. 13.	No. 14.	No. 15.	No. 16.	No. 17.	No. 18.	No. 19.	No. 20.	No. 21.	No. 22.
Price, per lb....	43	43½	43½	44	44½	45	45½	46	47	48	49	52	57

200 lbs. to 30,000 lbs., 3 cents off list; 30,000 lbs. and over, 4 cents off list.

PRICE LIST FOR GERMAN SILVER IN SHEETS AND ROLLS.

Per cent.	Price per lb.	Per cent.	Price per lb.
12.....	$0.52	16.....	.58
13.....	.53	17.....	.59
14.....	.54	18.....	.60
15.....	.55		

These prices are for sheets and rolls over 2 inches in width, to and including 8 inches in width and to No. 20, inclusive, American or Brown & Sharpe's Gauge. Prices are for 100 lbs. or more of one size and gauge in one order. Discount 40 per cent.

Munts or Yellow Metal Sheathing (14" x 48")	18c. lb. net base.
" " " Rectangular Sheets other than Sheathing	20c. " " "
" " " Rod	19c. " " "
Tobin Bronze Rod.....	21c. " " "

Above are for 100 lbs. or more in one order.